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AGRICULTURAL
JOURNAL***E & A**A crop of winter green feed
on an East Moreton dairy farm.***LEADING FEATURES**Agriculture in the Upper Burnett
Harvesting and Packing Pineapples
Survey of Herd WastagePulpy Kidney of Sheep
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Edited by
C. W. WINDERS, B.Sc.Agr.



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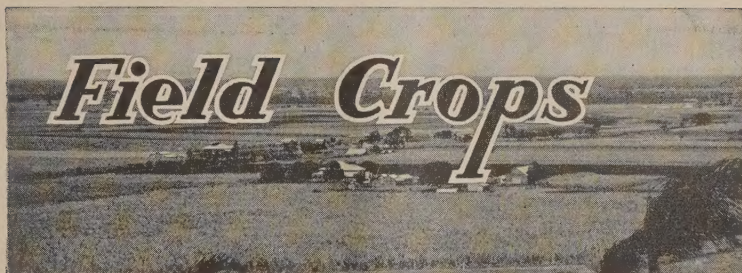
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Agriculture in the Upper Burnett.

K. V. HENDERSON, Senior Adviser in Agriculture.

THE district defined as the Upper Burnett in this article is that portion of the Burnett River basin which is bounded by the Dawes Range on the north, the Burnett Range on the east, and the Auburn Range on the western side (see Plate 108). This area embraces a large percentage of first-class agricultural land along the creek frontages, second-class agricultural land on the lower slopes and the Mulgildie Plateau, and first- and second-class grazing country on the remainder.

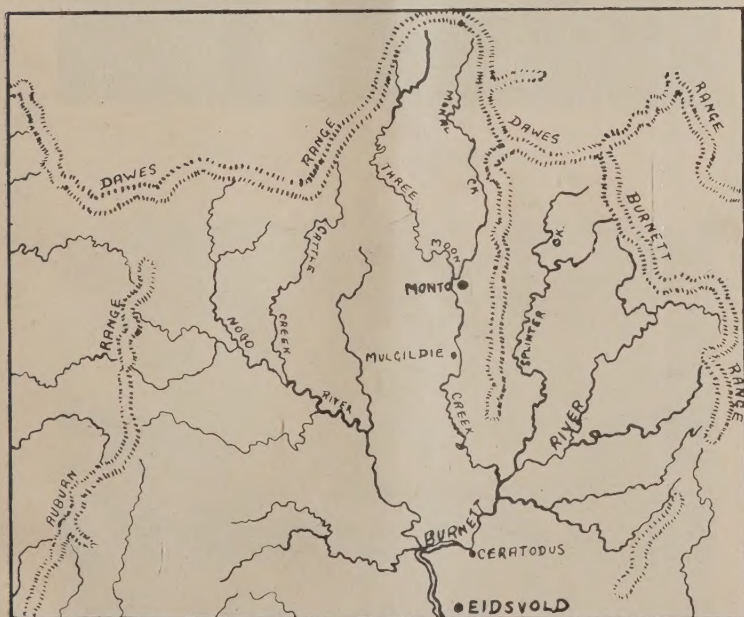


Plate 108.

SKETCH MAP OF THE UPPER BURNETT.

Subsequent to the passing of the Upper Burnett and Callide Valley Land Settlement Act in 1923, station holdings such as Mulgildie, Dalgangal, Cania, and Cannindah, in the Upper Burnett, were resumed and surveyed into living areas with the object of closer settlement. Demonstration areas were established in 1922 in the vicinity of the present town of Monto, the object being to grow various crops and so demonstrate to prospective settlers the productivity of the soils in the district. In all, 70 acres of scrub, forest, and alluvial soils were utilised for this purpose. Ballots for the blocks were conducted in December, 1923, and it was not long before the first pioneers arrived on their holdings to commence the development of what has now become a thriving dairying district.

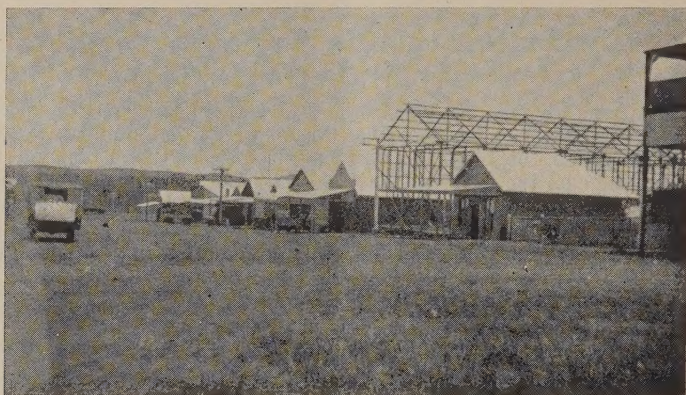


Plate 109.

THE MAIN STREET OF MONTO IN 1928.

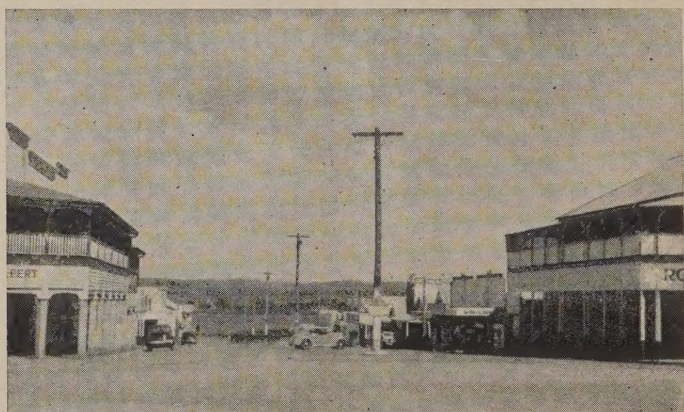


Plate 110.

THE MAIN STREET OF MONTO IN 1948.

These blocks were opened originally as Perpetual Lease Selections and Grazing Homestead Leases, but later some selections were converted into Agricultural Farms on a freehold basis. Although much of the area is cleared it is considered that there is still scope for further development on most of the farms to improve the output of primary produce from the district. Such improvement could be brought about by better cultivation practices and grassland management.

Monto (Plates 109 and 110), the principal town in the district and 767 feet above sea level, is, for its 24 years of existence, a very prosperous business centre. Railway communication is with Maryborough and Gladstone, 179 miles and 101 miles distant, respectively. Latest available figures place the population of the township of Monto at 1,869 and of the district generally at 4,500.

CLIMATE.

The Upper Burnett has a sub-tropical inland climate, summer maximum temperatures averaging over 90 deg. F., while over 106 deg. F. has been recorded during heat wave periods. In winter a ground minimum temperature as low as 17.5 deg. F. has been recorded.

Rainfall is mainly distributed over the summer months from October to March, although fair rains may be experienced during the winter months. Individual monthly totals for Monto are shown in Table 1 for the period 1937 to 1948, inclusive.

TABLE 1.
RAINFALL (IN POINTS) AT MONT0, 1937-1948.

Year.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Yearly Total.
1937	86	547	568	36	55	103	174	143	4	248	348	417	2,729
1938	555	16	880	127	579	187	215	180	4	306	648	174	3,771
1939	603	390	949	381	51	274	269	56	25	149	105	668	3,920
1940	243	507	636	96	58	22	70	96	67	23	252	302	2,372
1941	307	124	323	92	310	262	7	52	26	192	194	193	2,082
1942	815	1,602	98	182	178	84	147	38	34	105	88	682	4,053
1943	292	484	37	188	253	193	Nil	121	Nil	732	162	410	2,983
1944	403	375	128	77	261	89	227	101	29	25	461	147	2,323
1945	487	714	120	229	114	187	275	Nil	132	235	141	253	2,887
1946	272	47	217	44	Nil	2	24	12	75	232	257	105	1,227
1947	206	1,042	499	78	74	2	15	195	347	192	506	321	3,477
1948	237	467	351	220	408	286	275	Nil	120	Nil	309	258	2,931
Av. 12 year period	375	526	400	146	195	141	142	83	81	203	289	327	2,896

SOILS AND VEGETATION.

The soils can be broadly classified into four main groups, each of which carries a distinctive vegetation association. These groups are—(1) alluvial soils, (2) the soils of the lower slopes, (3) the brigalow scrub soils, and (4) the softwood scrub soils.

Alluvial Soils.

These soils carry a forest vegetation of which the main constituent is blue gum (*Eucalyptus tereticornis*). Spotted gum (*E. maculata*), mahogany or apple tree (*Angophora* sp.), and Moreton Bay ash (*Eucalyptus tessellaris*) are also found.

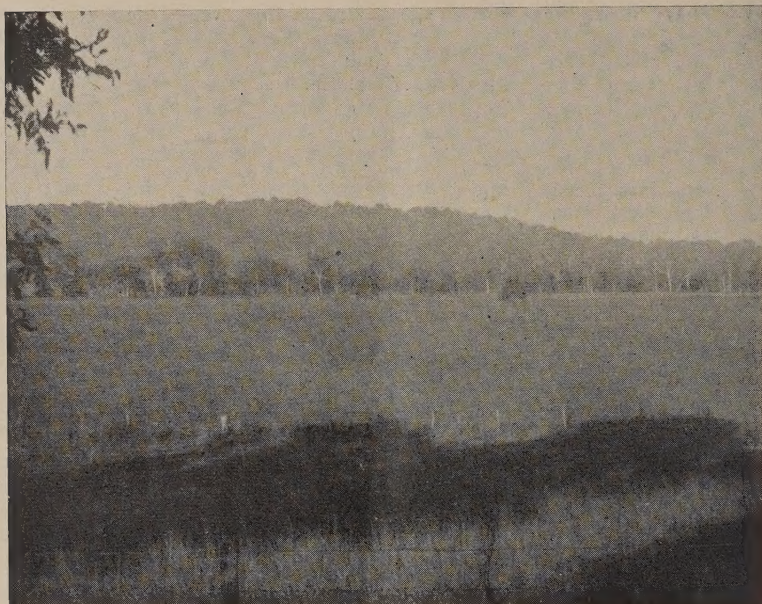


Plate 111.

LUCERNE PADDOCK ON MONAL CREEK.



Plate 112.

CULTIVATION LAND ON THE MONAL CREEK ALLUVIAL.—This is the site of the Monal Creek Exploratory Farm which was operated in the early days of closer settlement in the area.



Plate 113.

CATTLE PUMPKINS ON AN ALLUVIAL FARM.—This property is close to the junction of Three Moon and Splinter Creeks with the Burnett River.



Plate 114.

A LAGOON ON MONAL CREEK ALLUVIAL FLATS.—This area is now cultivated after being drained.

The alluvial soils occur as a narrow belt along Three Moon and Monal Creeks (Plates 111 to 114). They are deep loams to sandy clay loams, usually brown in colour and of good structure. Under cultivation they are very productive, growing excellent maize crops and lucerne and other fodders.

Soils of the Lower Slopes.

These soils abut on the alluvials and generally form a division between the latter and the scrub soils. They are timbered principally with yellow box (*Eucalyptus* sp.) and grey box (*E. populifolia*), interspersed with spotted gum, broad and narrow leaf ironbarks (*E. siderophloia* and *E. crebra*) and bloodwood (*E. corymbosa*). The soils are mostly light-grey, grey-brown, and brown clay loams. They have not a well-developed or stable structure and continued cultivation reduces the surface soil to a very fine powdery state. In this condition they do not readily absorb moisture, and after heavy rain tend to set hard on the surface. It is, therefore, particularly desirable on these soils to practice suitable crop rotation, otherwise loss by soil erosion can be serious. In normal wet seasons they produce good pasturage and good crops of fodder and cotton.

Brigalow Scrub Soils.

These soils originally carried vegetation consisting mainly of brigalow (*Acacia harpophylla*) and belah (*Casuarina lepidophloia*), with wilga (*Geijera parviflora*) predominating in the undergrowth. The surface soils, which are seldom more than 3 inches deep, are light brown, yellow-brown, or brown clay loams and clays. The subsoil is a yellow or grey heavy sticky clay.

Good cotton and other agricultural crops have been produced on this type of land, which is also capable of carrying prolific Rhodes grass pastures.

Resuckering is a problem in brigalow scrub areas, and negligence can result in a regrowth of "whip-stick" brigalow which is more difficult to clear than the original scrub. The general procedure of developing these areas is to fall and burn the scrub, then plant a cash crop or sow Rhodes grass amongst the unburnt timber and stumps. Subsequent firing of the Rhodes grass burns the stumps and suckers which appear. This procedure, however, does not always satisfactorily control suckering. An alternative method consists of ringbarking the original brigalow and several years later firing the area. In general, constant attention is required to control suckering.

Softwood Scrub Soils.

In the main, trees of the softwood scrub areas (Plate 115) are Flindersia (*Flindersia collina*), scrub iron bark (*Bridelia exaltata*), whitewood (*Atalaya hemiglauca*), messmate (*Eucalyptus* sp.), with occasional specimens of iron (steel) wood, which belies the name softwood, being very tough.

These soils are chiefly fairly deep, friable, red or brown loams merging into clay in the deep subsoil. They are of volcanic origin, with the parent rock generally several feet below the surface. In normal seasons, many agricultural crops will grow successfully on soils of this type, as, for instance, on the Mulgildie Plateau (Plates 116 and 117), which includes some 1,500 acres of red volcanic loam.

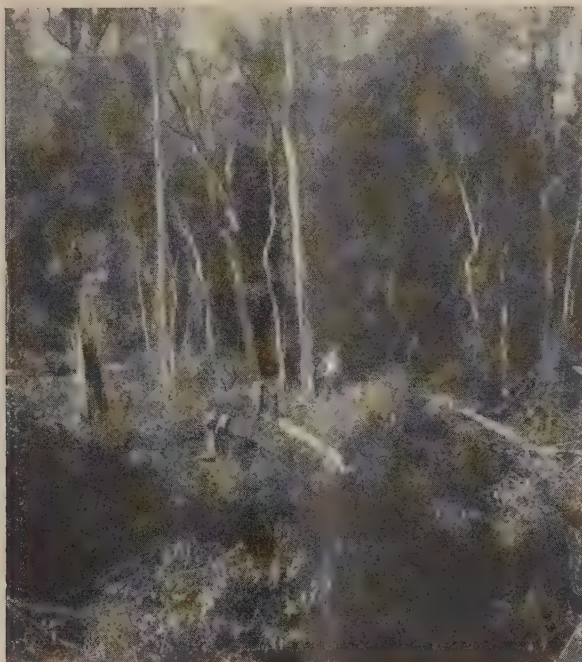


Plate 115.

SOFTWOOD OR VINE SCRUB, NEAR MONTGOMERY.—After falling this type of scrub and burning, Rhodes grass or green panic grass is planted.

The soils of the scrub areas as well as those of the lower slopes are subject to erosion, especially during the summer rainfall season when the rains are sometimes torrential. Farmers who have realised the potential menace of erosion have adopted measures to reduce it by keeping a good grass growth on all areas where erosion is liable to occur. Consequently, erosion has not yet developed to any serious extent. The Soil Conservation Service of the Department of Agriculture and Stock has established soil erosion control demonstrations in the area, featuring methods of forming pasture contour furrows on grassland and of constructing contour banks and waterways on cultivated land. Farmers seeking advice in regard to soil erosion problems are recommended to discuss them with appropriate officers of the Department of Agriculture and Stock.

WATER FACILITIES.

As the principal creeks do not flow continuously, and because of water restrictions during dry periods, it is not possible for farmers on the alluvials to irrigate throughout the year without having recourse to wells. These are usually sunk in positions convenient to the areas intended for irrigation. Water is found at depths ranging from 20 to 35 feet and flows up to 10,000 gallons per hour have been obtained.



Plate 116.

VIEW FROM MULGILDIE PLATEAU, LOOKING TOWARDS THE MULGILDIE-SELENE AREA.



Plate 117.

VIEW FROM MULGILDIE PLATEAU, WITH MAIZE AND GRAIN SORGHUM IN THE FOREGROUND.

There are approximately 30 irrigation units working in the district, the main use being for lucerne crops for hay and grazing purposes, although some farmers are now producing excellent crops of potatoes, onions, and cotton under irrigation.

The weiring of Monal and Three Moon Creeks is at present receiving attention with a view to providing a more adequate storage of water for dry season use, and these weirs when completed will be a boon to the farms in the vicinity.

On farms of the lower slopes and scrub areas where surface water is not available, water for stock is often provided by the establishment of dams or earth tanks. In many cases bores have been necessary, and in some instances these exceed 150 feet in depth. They do not always provide first-class stock water.

PASTURES.

In common with the greater part of Queensland the pastures of the Upper Burnett are summer growing, producing a flush of green feed following spring and summer rains but rapidly losing their palatability and nutritive value as they mature.

Native Pastures.

The most important of the native grasses which originally occurred on the better class of open country included Queensland blue (*Dichanthium sericeum*), forest blue (*Bothriochloa intermedia*), kangaroo (*Themeda australis*), and a number of star and windmill grasses (*Chloris* spp.). Other species were early spring (*Eriochloa* spp.) and love grasses (*Eragrostis* spp.). As these were subjected to heavy grazing the two blue grasses and kangaroo grass were reduced and their places taken by pitted blue grass (*Bothriochloa decipiens*), bunch spear grass (*Heteropogon contortus*), and white spear or wire grasses (*Aristida* spp.). A season of high rainfall favours the re-establishment of native grasses to a very marked degree. This feature was well demonstrated in the 1948-49 summer season in regard to Queensland blue and forest blue grasses particularly.

On the poorer country—as, for example, ironbark ridges—the main grasses are bunch spear grass, barb wire grass (*Cymbopogon refractus*), love grasses, spear (*Stipa* spp.), wire or white spear, and cane (*Leptochloa* spp.) grasses. Most of these grasses provide inferior grazing, being very unpalatable and non-nutritious when mature. Bunch spear grass, however, provides a large quantity of roughage before seeding.

The spear and wire grasses are a problem to manage, and where they are established it becomes very difficult to avoid burning of the pastures, as it is almost impossible to work among these grasses once they are mature. However, wherever these grasses do not occur the practice of burning pastures should not be followed.

Carrying capacity of these native pastures under normal conditions varies from place to place, but ranges from about a beast to 10 acres to a beast to 7 or 8 acres.

Legumes do not form any appreciable part of the native pastures; nevertheless a number of species occur, most of which are readily eaten by stock. The commonest is the twining species known as the slender sweet root vine or Glycine pea (*Glycine tabacina*), while *Rhynchosia*

minima, a twiner with bright yellow flowers, and the nine-leaved indigo (*Indigofera enneaphylla*) are usually found in the pastures. Other pasture legumes include members of the genus *Vigna*, *Zornia diphylla*, the emu grasses (*Psoralea* spp.) and rattlepods (*Crotalaria* spp.).

Sown Pastures.

Sown pastures are usually established on the areas originally carrying brigalow or softwood scrub. The original grass stand in these areas was naturally sparse, the most important species being the so-called brigalow grasses (*Paspalidium* spp.). Many thousands of acres of former scrub lands now carry excellent stands of Rhodes grass pasture which, like the native grasses, produces a great bulk of feed in the summer and autumn growing seasons.

Attention of recent years has been focussed on the introduced green panic, blue panic, and buffel grasses. They have a similar growing period to Rhodes grass, and are similarly established on land formerly under scrub. There are indications that green panic will compete better with the poorer native grasses, at least on the less fertile ridge areas, than will Rhodes grass.

Paspalum is another valuable introduced grass; it grows best on the moister low-lying areas along creek flats.

The carrying capacity of these sown pastures is much higher than that of the native grasslands, and may be as high as a beast to 4 acres.

The various native legumes already listed may also be found occasionally in the sown pastures as a result of natural dispersal. Of the introduced legumes, lucerne is the most important and should be used for grazing wherever possible.

WEED PROBLEMS.

As with many other districts in Queensland the main weed problems occur along the creek frontages. Chief among the weeds are Noogoora burr (*Xanthium pungens*), Bathurst burr (*X. spinosum*), and Mexican poppy (*Argemone mexicana*). The last-named is particularly serious because of its very free seeding habit. Brushing, mowing, and the application of weedicides are commonly employed to control weed growth. Nutgrass (*Cyperus rotundus*) and common couch grass (*Cynodon dactylon*) are commonly found in cultivations on the creek bank alluvials. Other common cultivation weeds include red pigweed (*Portulaca oleracea*), convolvulus or bindweed (*Ipomaea plebeia*), flannel weed (*Sida cordifolia*), and bullhead (*Tribulus terrestris*). In addition, on some scrub areas wild salvia (*Salvia coccinea*) and datura (*Datura stramonium*) have become prevalent.

In some softwood scrub areas suckering of a tree commonly called bitter bark (*Alstonia constricta*) is a nuisance. Weedicides containing arsenic are usually applied to control this sucker growth.

AGRICULTURAL CROPS.

The main cultivation areas are situated between Three Moon and Splinter Creeks, within a radius of 20 miles from Monto. As the yearly rainfall occurs for the most part between the summer months of November and March, summer growing crops form the basis of the

crop programme. Fair success, however, is obtained with winter growing crops in years of suitable rainfall. Dairying is the main primary industry of the district and, for the most part, crop production is closely allied to dairying activities.

Cereals.

Maize.—In recent years the acreage sown to this crop has declined because of the unfavourable summer seasons which have occurred. The area planted in 1947-48 was estimated to be more than 1,000 acres, from which over 30,000 bushels of grain were produced. The greater part of the maize grown is used on farms to feed pigs.

Grain Sorghum.—This crop has rapidly gained favour because it is more reliable than maize in a diversity of seasons. It can be grown on a wide range of soil types, shows drought resistance superior to maize, and can be harvested mechanically. In 1947-48 more than 5,000 acres were planted, the yield exceeding 165,000 bushels of grain. Wheatland, Kalo, and Hegari are the most favoured varieties.

Fodder Crops.

Sudan grass, saccharine sorghums, and millets are extensively grown as summer fodder crops on many dairying farms, with good results. Over 11,000 acres were grown in the 1947-48 season.

Winter grazing crops of wheat and oats are used with some success, and in good winter seasons grain is sometimes harvested after the crops have been grazed.

Lucerne.

The area under lucerne in 1947-48 was about 2,500 acres. This crop is grown mainly on the alluvial soils bordering the creeks, where sub-surface water is commonly found within 30 feet. During the past six years irrigation has been favoured and total yields of up to 6 tons of hay per acre per year have been cut, compared with yields of 2-2½ tons from dryland farming.

Cotton.

The rapid development of the Upper Burnett was due in no small measure to the good cotton crops which were harvested in the early years of settlement. This crop was suited to a number of soil types, and very little machinery was required to cultivate it successfully on virgin land. Yields of 1,600 lb. of seed cotton per acre were produced from individual areas varying from 5 to 40 acres in extent. In 1930, the total area under cotton was approximately 14,000 acres, but by 1947 the area had declined to 800 acres, which yielded 420 lb. of seed cotton per acre. Many reasons could be advanced for this decline, but, apart from a succession of unfavourable seasons and lower yields per acre, the main causes have been the relatively better prices for dairy and other farm produce which have prevailed in recent years and the scarcity of suitable labour for harvesting.

The most popular varieties are Miller, Triumph, and New Mexico Acala.



Plate 118.

COTTON BEING HAULED TO CERATODUS IN 1925.

Peanuts.

This crop has not been grown to any great extent, as the soil types necessary for profitable production are confined to a small tract of country adjacent to the red volcanic loam on the Mulgildie Plateau. Both Virginia Bunch and Red Spanish varieties are grown. In 1947-48 800 acres were grown, but yields were disappointing. Adverse seasonal conditions and a mice plague which occurred at harvesting time were chiefly responsible for the low yields.

Other Crops.

Small areas of potatoes are grown mainly for local consumption, but in the 1948 season 204 tons were marketed outside the district from 62 acres. The popular varieties are Factor, Carman, and Bismarck; late summer and early autumn planting is favoured.

Pumpkins of the Beaudesert or Queensland Blue variety are cultivated to a small extent, chiefly for home consumption. A small acreage is also grown for cattle fodder.

HORTICULTURAL CROPS.

Horticultural cropping is not of any economic importance other than to provide fresh vegetables and fruit for the farmer's own requirements and for local shops during a part of the year. The greater portion of the local demand for fruit and vegetables, however, is met by outside markets.

Citrus is being grown commercially on the Burnett River, near Ceratodus, but these orchards are only just coming into production.

THE DAIRYING INDUSTRY.

The small herds which were introduced into the district during 1925 and 1926 did not produce sufficient to warrant a local processing factory. Consequently, cream had to be transported by road to Ceratodus, 40 miles away from Monto, and thence by rail to Mundubbera. Under these conditions the industry made no progress until 1928, when the railway was constructed closer to Monto. This improvement gave an impetus to the growth of the industry, and in 1928 the Monto butter factory of the Port Curtis Co-operative Dairy Association was erected. Since then, herds have been improved and numbers have increased, and a prosperous dairying industry has now been developed.

Production figures of the Monto butter factory have ranged from 293 tons in 1929-30 to 2,144 tons in 1938-39. Production declined during the war years, but in recent years has begun to improve.

A pig-raising industry has developed in conjunction with dairying, and approximately 15,000 pigs were marketed from the district in 1947-48.

Conservation of fodder is a practice followed by many dairymen, the most favoured method being the production of lucerne and millet hays and their storage in haystacks. Some interest has been shown in tower silos for silage but where silage is conserved it is usually stored in the less expensive and more convenient trench silos.

Jersey and A.I.S. breeds of dairy cattle are equally favoured. Generally, dairy farmers are showing greater interest in herd improvement, and the intake of pure-bred stock into the district has increased.

Most dairy holdings range from 250 acres on the alluvial soils and brigalow scrub areas to 600 acres on the lower slope and softwood scrub areas.

THE GRAZING INDUSTRY.

Outside the main agricultural areas there is much good to medium grazing land, and with present-day prices of cattle the grazing industry is a thriving one. Individual holdings vary in size from 5,000 to 10,000 acres, and the native pasturage is utilised mainly for store cattle and fattening purposes.

Herefords are the most popular breed on these areas, but in recent years there have been introductions of Aberdeen Angus.

It is estimated that during the season 1947-48 beef cattle valued in excess of £100,000 were railed from the district.

FORESTRY.

During the past 10 years or so a great tract of pine forest in the range country between Kalpowar and Builyan has been opened up for supervised exploitation. Many millions of super feet of timber have been cut from this area and reafforestation has been carefully carried out.

The Coomingleh Range country has been declared a Forest Reserve for the care and production of hardwood timbers, chiefly spotted gum, ironbark, and bloodwood. Two sawmills are located at Monto and one at Abercorn. Several millions of super feet of hardwood are milled annually in the district.



Harvesting, Handling and Packing Pineapples.

C. G. WILLIAMS, Supervisor, Preparation and Transport, Horticulture Branch.

THE development of a satisfactory trade in fresh pineapples depends on the fruit being in a sound and palatable condition. The stage of maturity at which the fruit can be picked, and the methods of harvesting, handling and packing, are largely determined by the ultimate destination of the fruit.

The requirements for markets in Brisbane, Sydney and Melbourne have been fairly well established, but careful handling methods and the control of wastage, particularly that due to water blister, still require greater attention from growers. The normal pack for these markets is of average grade and suitable only for town trade. However, there is a demand for a pack of a higher standard comparable with the "Extra Fancy" grade of apples and pears. To this end, specifications have been drawn up for a "Special Pack" scheme, and an attractive label under which this fruit may be marketed can be obtained from the Committee of Direction of Fruit Marketing. This label is virtually a guarantee of quality, and it is anticipated that such fruit will command a premium over the normal pack. For export to New Zealand, longer transit and additional handlings are involved; but, as a result of trial consignments during the 1948-49 seasons, it is now possible to make recommendations in regard to picking maturity and methods of packing for the New Zealand market.

SELECTION OF FRUIT.

In selecting fruit for the fresh fruit market, particular attention should be given to the rejection of fruit not of normal type. The following types of fruit should be excluded from all packs:—

- (a) Fruit visibly affected with sunburn, frost injury, yeasty rot, black speck or bruises;
- (b) Fruit showing any leakage of juice at packing, whether from bruises, growth cracks or other causes;
- (c) Fruit with more than two tops;

- (d) Fruit with knobs or slips on base of fruit;
- (e) Fruit without tops or with aborted, dwarfed or deformed tops;
- (f) Malformed or crippled fruit;
- (g) Fruit whose stalks have been wholly or partly broken before maturity. Such fruit is invariably of poor quality and subject to black heart.

Very careful selection of fruit is essential for the special and export packs, and only fruit of the highest quality should be included.

HARVESTING.

Removal of the Fruit from the Plant.

During the summer months, when water blister is likely to be prevalent, fruit for all markets should be cut from the plant with a long, stout-bladed, sharp knife, leaving a basal stem approximately $\frac{1}{2}$ -1 inch long. Fruit marketed under the special pack scheme, or destined for New Zealand, should be cut throughout the year. At the time of packing, the stem should be trimmed back so that it projects not less than $\frac{1}{4}$ inch below the lowest portion of the base of the fruit.

Stage of Maturity.

The stage of maturity at which fruit should be picked depends to a large extent on its ultimate destination. Fruit grown in close proximity to the markets can be picked in a fairly forward condition. Fruit destined for Sydney and Melbourne markets may be picked at a stage slightly more advanced than that to be consigned to Adelaide or New Zealand. For the latter markets, the colour at the time of picking must not be more than the minimum standard prescribed in the regulations under "*The Fruit and Vegetables Act.*" Under these regulations, the fruit must be fully developed and (1) during the months of October to March show a distinct tinge of yellow colour at the base and contain a total sugar content of the juice of not less than 12 per cent.; (2) during the months of April to October be half yellow colour at the base and contain a total sugar content of the juice of less than 10 per cent.

Handling after Picking.

While careful handling methods from the plantation after picking are essential irrespective of the ultimate destination of the fruit, the requirements in this respect are particularly exacting for fruit exported to New Zealand, as the cases are handled a considerable number of times before they reach the consumer. After the fruit is removed from the plant, it may either be carefully placed on top of the plants in the row for subsequent collection in a suitably sized basket or be collected and carried in the arms of the operator or placed directly into the basket, which should be padded with woodwool and free of any internal projection.

When the pineapples are being transferred from the harvesting basket, or from the arms of the operator, they should as far as practicable be placed in a harvesting box which will contain fruit of the same size. This rough size grading in the field will save excessive handling

of the fruit prior to final grading at the time of packing. Moreover, if this field grading is done effectively the fruit need only be handled three or four times during the whole operation.

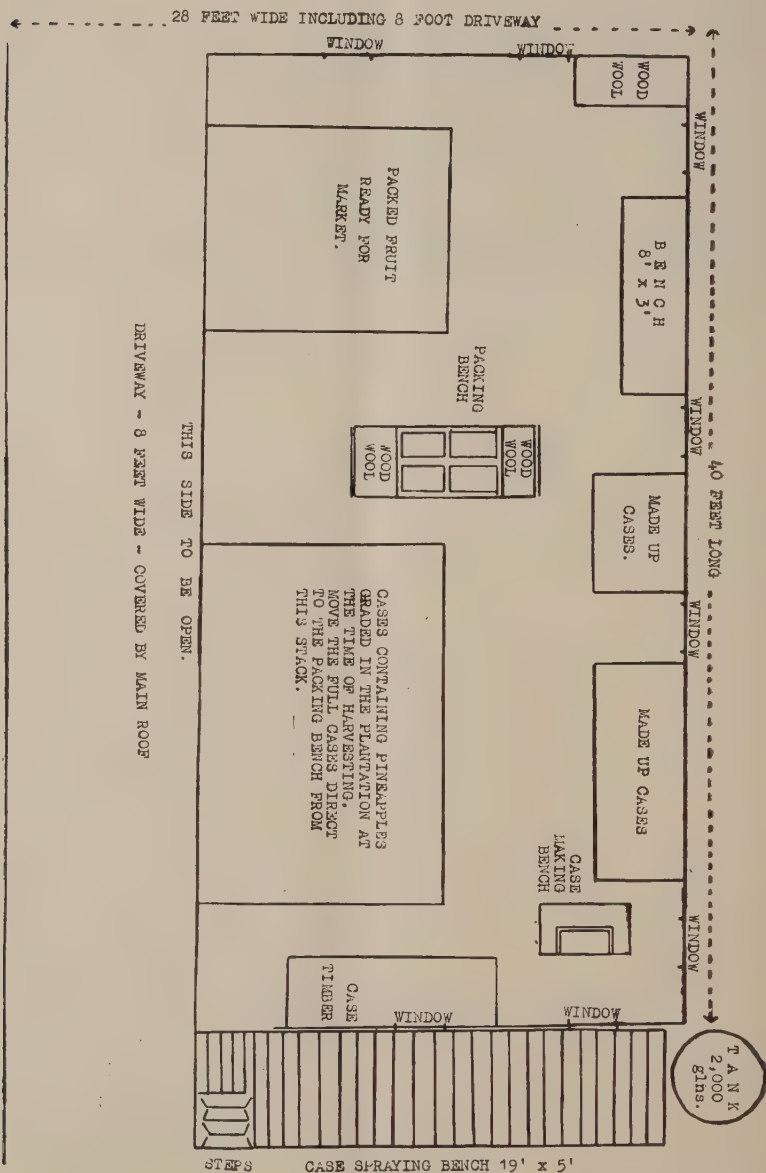


Plate 119.

GROUND FLOOR PLAN OF PINEAPPLE PACKING SHED.

Harvesting containers such as the tropical case or the pineapple factory case, preferably the latter, should be placed at the end of the plantation rows and protected with woodwool or other suitable padding material.

Transport from the Plantation to the Packing Shed.

The most suitable harvesting conveyance is a rubber-tyred vehicle with trailer attached; but whatever type of container or transport vehicle is used, the fruit should not be placed in a high stack, as this is conducive to bruising. If the pineapples are packed above the top of the harvesting box, then the boxes should be stacked only one high on the transport vehicle. If they are packed below the top of the case, the cases can be stacked two or three high and woodwool placed between each tier. A horse drawn slide is not suitable for the transport of pineapples; but, where this type of conveyance is necessary on steep hills, the harvesting cases must not be stacked more than one high.

The Packing Shed.

At the packing shed the harvesting cases should be unloaded onto the floor of the shed and placed in stacks or in single case units containing each grade size. To facilitate packing, the cases should be placed as near as possible to the packing stand.

To reduce the number of handlings during packing, a packing stand which will accommodate two or four cases of fruit should be a moveable part of the packing shed equipment. A floor plan of a model packing shed showing the position of a four case packing stand is illustrated in Plate 119.

Packing Shed Operations.

Cases.

All fruit should be packed in clean cases. New cases must be used for export, but second-hand cases from which all previous marks have been obliterated can be used for local or interstate trade. The tropical case of internal measurements $24\frac{1}{2}$ in. long x 12 in. deep x 12 in. wide is used for all markets, but in addition a smaller box, designated "the pineapple case," of internal measurements $24\frac{1}{2}$ in. long x 10 in. deep x 12 in. wide may be used for export. The tropical case is suitable when grading is accurate. However, in pineapple plantations grading is by hand, and accurate grading is difficult. The smaller case has given the more satisfactory results in export, but necessitates the use of a greater amount of woodwool and timber per unit weight of fruit.

Cases described as "Tropical" and "The Pineapple" shall be constructed from softwood or hardwood in accordance with the following specifications:—

TROPICAL CASE.

1. Each end shall be 12 inches wide by 12 inches deep by $\frac{3}{4}$ inch thick and consist of two pieces.
2. Each side shall be of three boards each $26\frac{1}{4}$ inches long by $\frac{5}{16}$ inch thick and aggregate 10 inches in width. An aperture $\frac{5}{8}$ inch wide shall be allowed between the boards.
3. The top and bottom shall each be of two boards each $26\frac{1}{4}$ inches long by $\frac{5}{16}$ inch thick and aggregate not less than $11\frac{1}{2}$ inches and not more than 12 inches in width.
4. Two cleats each measuring 12 inches long by 2 inches wide by $\frac{5}{16}$ inch thick shall be used to join the two pieces of the end boards and shall be placed parallel to the sides of the case.

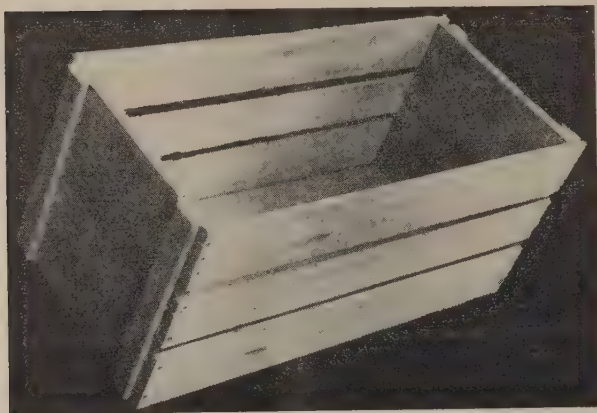


Plate 120.

THE TROPICAL CASE.—Showing method of making up, with the sides overlapping the top and bottom of the case to an extent equal to the thickness of the top and bottom boards. The cleats are placed parallel to the sides of the case.

PINEAPPLE CASE.

1. Each end shall be 12 inches wide by 10 inches deep by $\frac{3}{4}$ inch thick and consist of two pieces.
2. Each side shall be of two boards each $26\frac{1}{4}$ inches long by $\frac{5}{16}$ inch thick and aggregate 10 inches in width. An aperture $\frac{5}{8}$ inch wide shall be allowed between the boards.
3. The top and bottom shall each be of two boards each $26\frac{1}{4}$ inches long by $\frac{5}{16}$ inch thick and aggregate not less than $11\frac{1}{2}$ inches and not more than 12 inches in width.
4. Two cleats each measuring 10 inches long by 2 inches wide by $\frac{5}{16}$ inch thick shall be used to join the two pieces of the end boards and shall be placed parallel to the sides of the case.

Packing Procedure.

Prior to the commencement of packing, one or two boxes of the field graded pineapples should be moved from the intake stack onto the packing stand. The packer will find that, if two or three market cases are conveniently arranged on the opposite side of the stand from the harvesting boxes, he can pack two or three colour or grade sizes simultaneously. This procedure will expedite packing and eliminate extra handling of the fruit when grading for size in the field is not accurate.

Fruit in the packed case should be uniform in size. For special and export packs it should also be uniform in colour. Oversized tops may be trimmed back to not less than 2 inches from the solid core of the top. Further trimming may result in water blister development.

Grading Rings.

Quite suitable grading rings may be made from heavy gauge wire or by cutting holes of a required diameter out of 3-ply or pine board. A pineapple that will pass through a 4-inch ring but which will not pass through a $3\frac{3}{4}$ -inch ring is classified as $3\frac{3}{4}$ grade size. For



Plate 121.
11 COUNT PACK.—Bottom Layer.



Plate 122.
11 COUNT PACK.—First and Second Layers, 4 x 3.



Plate 123.
11 COUNT PACK.—Top View of Finished Case. Three Layers, 4 x 3 x 4.

trade purposes the size grade is referred to by the number of pineapples in the case, such as 11, 12, 14, &c., count. Each variety may vary in shape, but provided proper grading methods are used no difficulty should be experienced in packing fruit of regular shape. It is advisable to set aside irregularly shaped pineapples until sufficient fruit of the same size is obtained to pack a full case. Large pineapples are not welcomed by the trade, and fruit larger than 11 count should be forwarded to the factory. Pineapples smaller than 27 count are suitable for local market only.

Method of Packing.

All packs should have the fruit placed across the case with the butts against the side of the case. There are two types of packs—namely, the straight pack for counts of 11-14 and the “head and tails” pack for counts of 15-36. The former pack is sometimes used for a count of 15.

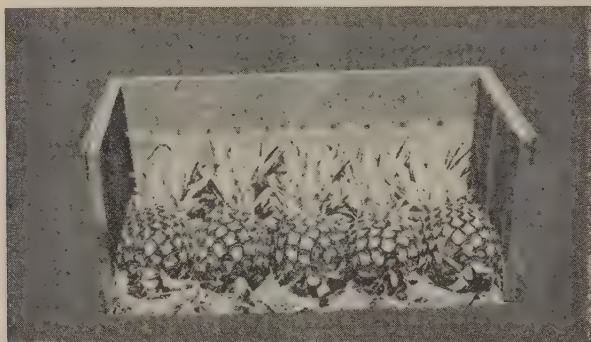


Plate 124.

14 COUNT PACK.—Bottom Layer.



Plate 125.

14 COUNT PACK.—Showing Position of Layers. Three Layers, 5 x 4 x 5.

For counts of 11 (Plates 121-123) and 12, the straight pack consists of three layers of fruit of a single row with the butt ends in each layer touching the same side of the case. The pineapples in the second layer are reversed so that the tops touch the same side of the case as

the butts in the first and third layer. This method of packing will also apply to counts 14 (Plates 124-126) and 15 when the long, square-shouldered type of fruit is being packed. For these counts a tighter pack is sometimes obtained by reversing the end or centre pineapple in each layer.

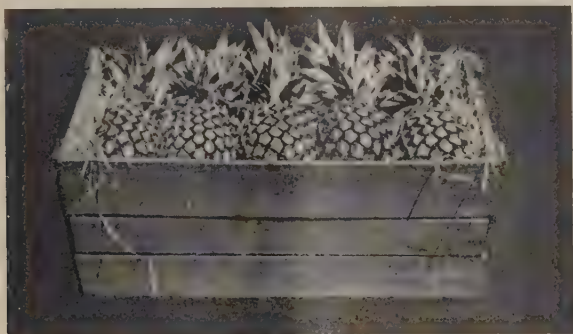


Plate 126.
14 COUNT PACK.—Top View of Finished Case.



Plate 127.
21 COUNT PACK.—Bottom Layer.



Plate 128.
21 COUNT PACK.—Showing Position of Layers. Three Layers, 7 x 7 x 7.



Plate 129.

21 COUNT PACK.—Top View of Finished Case.

Normally shaped pineapples of counts 15, 18, 21 (Plates 127-129), 24 and 27 are packed in three layers each of two rows and placed so that each alternate fruit has its butt end touching the opposite side of the case. Pineapples of counts 28, 32 and 36 are packed in a similar way except that four layers are used.

When placing the pineapple in the case, the packer should make the movement as he places the packing material around the bottom, sides and base of the fruit. Each fruit in the upper layers should be placed between the spaces of the fruits in the lower layer and not directly on top of the fruit.

Packing Material.

Woodwool and blady grass are used as packing materials, but the latter can only be used for fruit sold within the State. Packing material should be used on the top and bottom of the case, between each fruit, and at the base of the fruit where it touches the case. For special and export packs, approximately $2\frac{1}{2}$ to 3 lb. of woodwool should be used per case. For other packs, $1\frac{1}{2}$ lb. of woodwool per case is sufficient.

Height of Fruit in the Case.

When finished, the top layer of fruit should not be above the case, as sufficient space should be available for a protective layer of packing material. The slight pressure exerted when the case is lidded should result in a firm pack.

Packing Chart.

The methods of packing the various counts listed in Table 1 are recommended for fruit consigned to local markets and to Sydney and Melbourne.

TABLE 1.

Count (Number of Fruit to Case).					Approximate Diameter of Fruit.	Number of Layers in Case.	Number of Fruit in each Layer.
					In.		
11	..	..	..	..	$5\frac{1}{4}$ — $5\frac{1}{2}$	3	$4 \times 3 \times 4$
12	..	..	..	..	$5\frac{1}{4}$ — $5\frac{1}{2}$	3	$4 \times 4 \times 4$
14	..	..	..	..	5 — $5\frac{1}{8}$	3	$5 \times 4 \times 5$
15	..	..	..	..	$4\frac{3}{4}$ — 5	3	$5 \times 5 \times 5$
18	..	..	..	..	$4\frac{1}{2}$ — $4\frac{3}{4}$	3	$6 \times 6 \times 6$
21	..	..	..	..	$4\frac{1}{2}$ — $4\frac{3}{4}$	3	$7 \times 7 \times 7$
24	..	..	..	..	4 — $4\frac{1}{4}$	3	$8 \times 8 \times 8$
27	..	..	..	..	4	3	$9 \times 9 \times 9$
28	..	..	..	..	4	4	$7 \times 7 \times 7 \times 7$
32	..	..	..	..	$3\frac{3}{4}$	4	$8 \times 8 \times 8 \times 8$
36	..	..	..	..	$3\frac{1}{2}$	4	$9 \times 9 \times 9 \times 9$

In the special and export packs, and for fruit likely to receive a considerable number of handlings, more packing material is required to protect each individual fruit against bruising, and the methods of packing shown in Table 2 and illustrated in Plate 130 are therefore recommended.

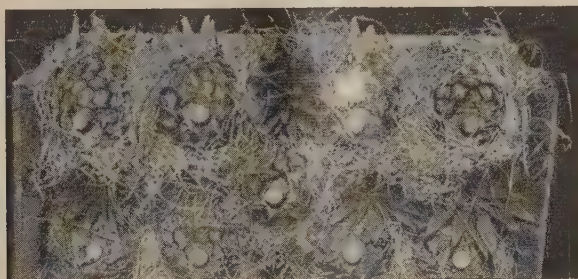


Plate 130.

PACKING FRUIT FOR THE SPECIAL AND EXPORT PACKS.—The fruit is cut from the plant and adequately protected with woodwool.

TABLE 2.

Count (Number of Fruit to Case).					Approximate Diameter of Fruit.	Number of Layers in Case.	Number of Fruit in each Layer.
					In.		
11	..	..	..	..	5	3	$4 \times 3 \times 4$
12	..	..	..	..	$4\frac{3}{4}$	3	$4 \times 4 \times 4$
14	..	..	..	..	$4\frac{1}{2}$	3	$5 \times 4 \times 5$
15	..	..	..	..	$4\frac{1}{2}$	3	$5 \times 5 \times 5$
18	..	..	..	..	4	3	$6 \times 6 \times 6$
21	..	..	..	..	$3\frac{3}{4}$	3	$7 \times 7 \times 7$
24	..	..	..	..	$3\frac{1}{2}$	3	$8 \times 8 \times 8$
27	..	..	..	..	$3\frac{1}{4}$	3	$9 \times 9 \times 9$

It will be observed that fruit of $4\frac{1}{2}$ inch diameter, which can be packed as an 18 count in Table 1, can only be packed as a 14 count in Table 2. The disparity between Tables 1 and 2 becomes more apparent as the fruit is reduced in size, and fruit of 32 count in Table 1 can only be packed as a 21 count in Table 2.

REQUIREMENTS FOR VARIOUS MARKETS.

Local and Interstate Pack.

For sale within Australia the fruit must comply with the grading regulations of the State in which the consignments are eventually sold. This fruit must be sound, clean, mature and the exposed surfaces of the package representative of the contents as a whole. The case should be branded with—

- (i.) Grower's name or registered brand and his address.
- (ii.) The name of the variety.
- (iii.) The count.
- (iv.) The consignee's brand.

Special Pack.

A grower may make application to the Department of Agriculture and Stock for permission to market his fruit under the Special Pack Scheme. He will be entitled to use the special label printed by the Committee of Direction of Fruit Marketing provided he cuts the fruit from the plant, handles it carefully, keeps the shed and environs in a clean condition, and packs only fruit of normal type, of one maturity and according to methods recommended in Table 2. Counts less than 14 or more than 24 should also be excluded. Fruit marketed under the special pack label has proved very suitable for country order trade and meets the demands for a pack of high grade quality. The same conditions as for local and interstate packs apply in regard to grading regulations.

Export Pack.

Fruit consigned to countries outside Australia must comply with the Commonwealth Export (Fresh Fruit) Regulations. Under these regulations, the export of pineapples is prohibited unless the fruit has been prepared in a registered export establishment. Any person who is the owner or occupier of any premises used for the receipt, processing, packaging or storage of pineapples may apply to the Department of Agriculture and Stock, on the prescribed form, for the registration of his premises as an export establishment. If the premises are constructed, equipped and operated in an efficient and hygienic manner and comply with the following conditions they may be registered as an export establishment:—

- (i.) The establishment shall be of such a nature as to minimise any harbourage for fungi or insects and any contamination of the fruits by foreign substances during the operations of stacking, handling, loading, processing, grading and packing.
- (ii.) The establishment shall be so constructed as to be sufficiently lighted for the purposes of efficient inspection and for the operations of the packing shed.
- (iii.) The establishment shall be ventilated in a manner approved by an officer.

- (iv.) The floors of the establishment shall be constructed of concrete or other suitable material, which shall permit of rapid and effective cleansing.
- (v.) The plant and equipment shall be of types approved by an officer.

The trade description shall be placed on one end of each case and shall set out:—

- (a) In letters or figures at least $\frac{1}{4}$ inch in height if printed on the cases or applied by means of printed paper labels, and at least $\frac{3}{4}$ inch if stencilled on the cases, the word "pineapples" and the number of pineapples contained in each case.
- (b) In letters at least $\frac{1}{2}$ inch in height, the word "Australia," the State or Territory in which the fruit was produced, the grower's name or registered brand and the number of his registered establishment.

Growers who are prepared to pack for export can expect a return for their fruit greater than that received for their normal interstate pack.

FACTORY FRUIT.

Harvesting.

In order to obtain fruit which will be acceptable for factory purposes, care must be exercised in handling and preparing the fruit. Prior to the fruit reaching the packing shed, treatment should be the same as that given to fruit intended for the fresh fruit market, except that fruit for factory may be snapped throughout the year. Maturity is judged more on internal than on external colour. The fruit should be harvested and forwarded when it is considered to have the necessary internal colour required for canning. The cannery requires fruit which at the time of processing shall be semi-translucent yellow in colour. Growers know from experience that relationship between external and internal colour varies with the site and locality in which the fruit is grown and must use their discretion as to when the fruit should be harvested. The external colour will vary from the first tinge of yellow at the base for the large fruit up to half colour for the smaller fruit, and maturity and colour vary as between the ratoon and the plant crop. The grower can best judge the internal colour by cutting several fruits. Allowance must be made for the ripening which will occur during transit. Fruit which is over-ripe is not satisfactory for processing, as it has a fermented flavour and the amount of trimming required is excessive; on the other hand, immature fruit cannot be used as it gives an unsatisfactory canned product.

Grading and Packing.

When the fruit reaches the packing shed, the tops and any knobby basal projections are removed. This should be done by cutting with a sharp knife, as the breaking off of knobs and tops by hand causes considerable damage to the fruit and affords a means of entry for fungi and yeasts. Considerable wastage from water blister frequently

occurs through this practice. When the fruit is trimmed it is placed direct into factory cases or crates. The grades required by canneries are described below:—

- (a) *Grade 2* should be 5 inches or more in diameter; that is, the fruit must not pass through a 5 inch grading ring. The pineapple must be true to type.
- (b) *Grade 1* should be 4 inches or more in diameter and less than 5 inches; that is, the pineapple must not pass through a 4 inch grading ring. Fruit should be true to type and have a full length of not less than 5 inches.
- (c) “*Smalls*” should not be less than $3\frac{3}{4}$ inches in diameter and $4\frac{1}{2}$ inches in length. If the fruit is smaller than “smalls” it must be fully developed and not less than 3 inches in diameter and 4 inches in length, but this fruit must show half colour on delivery at the factory.

Cannery pineapples are received by the C.O.D. for distribution to factories subject to the following conditions:—

- (1) At loading centres where C.O.D. loaders are employed pineapples will be accepted only through the C.O.D. loader.
- (2) All fruit must be freshly picked and loaded in a sound condition.
- (3) Only smooth leaf varieties will be accepted.
- (4) Fruit must be loaded on regular days as and when instructed.

During the winter months, quite a proportion of the fruit may be conical; this abnormally shaped fruit must be included in the lower grade. Grades must be marked plainly in white chalk on both ends of the cases as follows:—Grade 2 with a numeral “2”; Grade 1 with a numeral “1”, “smalls” with a letter “S”.

The C.O.D. Inspectors have been instructed that (a) if a case of Grade 2 contains one fruit which is undersized, the case will be graded down; (b) if a case of “ones” contains 10 per cent. or more of undersized fruit, the whole fruit must be graded down; and (c) if a case of smalls contains 10 per cent. or more of undersized fruit, the whole case will be rejected.

Branding.

All cases must be weighed and the tare to the nearest pound stencilled plainly on the top board of each side of the case. The cases must be branded with the grower's name and station underneath the tare on each side of the case. To facilitate the return of empty cases, all cases must be branded on each end with the code letter or letter allotted to the sending station. When the code is comprised of two letters, these must be shown together.

Cannery pineapples are carried on the railway on a case rate basis and it is therefore necessary that cases be packed to capacity. Care should be exercised to ensure that no fruit projects above the top of the case. The case should contain at least 64 lb. of fruit.

Further information on the basis of acceptance and other cannery requirements can be obtained from the C.O.D.

The methods of packing pineapples for factory purposes are illustrated in Plates 131 to 136.



Plate 131.

FACTORY PACK USED FOR VERY LARGE FRUIT OF GRADE 2, COUNT 14.—Bottom layer, 6 lying on the side; middle layer, 2 lying on the side; top layer, 6 lying on the side.



Plate 132.

FACTORY PACK USED FOR LARGE FRUIT OF GRADE 2, COUNT 16.—Bottom layer, 9 standing upright; top layer, 7 (3 pines have been removed to show the bottom layer), 3 lying on the sides lengthwise, and 4 lying on the sides at angle.

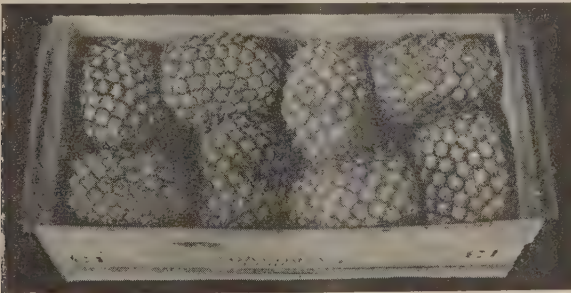


Plate 133.

FACTORY PACK USED FOR SHORTER FRUIT OF GRADE 2, COUNT 17.—Showing arrangement of the fruit in the top layer.

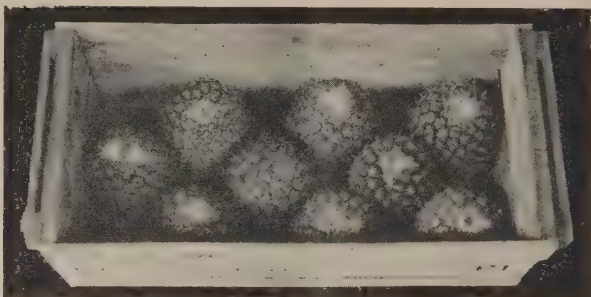


Plate 134.

FACTORY PACK USED FOR SHORTER FRUIT OF GRADE 2, COUNT 17.—Showing the arrangement of the fruit in the bottom layer.



Plate 135.

FACTORY PACK USED FOR LARGE FRUIT OF GRADE 1, COUNT 20.—Top layer, 8 lying on the sides (3 pineapples have been removed to show the bottom layer); bottom layer, 12 pines standing upright.

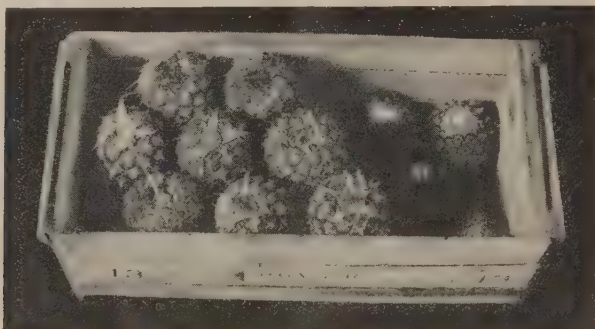


Plate 136.

FACTORY PACK USED FOR SMALLER FRUIT OF GRADE 1, COUNT 27.—Both layers standing upright; top layer contains 13 fruit; bottom layer contains 14 fruit.

Control of Wastage.

Wastage is likely to occur, especially in the summer months, through the development of water blister and yeasty rot. The two diseases sometimes occur together, but the former is more common and causes considerable wastage during the humid period of the summer. For the control of these diseases, strict sanitation in the field and packing shed should be practised and very careful handling methods adopted when the disease is likely to occur. All discarded fruit tops and other pineapple debris should be removed from the packing place within 24 hours and either buried or spread out in a heap at least 200 yards from the packing place. The packing shed and equipment should be kept clean, and disinfected once a week by spraying with a 2½ per cent. solution of formalin (4 fl. oz. per gallon). The presence of wounds on the fruit provides invasion points for the fungus. Such wounds are caused by injuries received during handling, by sunburn, knobs cut or knocked off, cut or broken tops and growth cracks. Fruit for the fresh fruit market or for factory should be handled carefully and cases suspected of being contaminated should be sprayed with a formalin solution.

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MEMBERS OF THE MURGON, WONDAL, MONDURE AND CLOYNA JUNIOR FARMERS' CLUBS
RECEIVING INSTRUCTION IN THE POINTS OF A DAIRY COW.

PLANT PROTECTION

Codling Moth and Light Brown Apple Moth Control Experiments, 1948-49.

A. W. S. MAY, Entomologist, Science Branch. *E.M.U.*

THE value of DDT for codling moth* control in apples in Queensland is now well established. Though methods for coping with the woolly aphid† and mite‡ populations that arise following repeated use of DDT in the orchard have been devised, these are additions to an already intensive spraying programme. The results of experiments conducted in the 1947-48 season suggested that a possible reduction in the number of DDT cover sprays could be achieved without detracting greatly from the control of codling moth. Accordingly, the 1948-49 season's experiments were concerned solely with comparing several DDT schedules differing in number and time of cover spray applications.

EXPERIMENTAL PROCEDURE.

The original intention was to include a calyx spray application as a treatment in the trial schedules, but severe frost in the Stanthorpe area in late October destroyed the greater proportion of the crop on the orchard where the experiment was located, and this section of the work had to be abandoned. After suitable modification of the original plan of procedure, two almost identical experiments using the late maturing Granny Smith variety were laid down on widely separated orchards free from frost damage.

The first cover spray was applied in early November. Both orchards had received a dormant or semi-dormant oil spray for mite control and a calyx spray of lead arsenate before the experimental treatments were applied. An early to midsummer treatment of hexaethyl tetraphosphate was uniformly applied to all trees for woolly

TABLE 1.

Schedule.	DDT Strength Employed.	Cover Sprays Applied.					
		1-11-48.	24-11-48.	14-12-48.	5-1-49	25-1-49.	15-2-49.
	Per cent.						
1 ..	0.1	✓	✓	✓	✓	✓	✓
2 ..	0.1	✓	✓		✓		✓
3 ..	0.1	✓	✓		✓		
4 ..	0.1	✓	✓		✓	✓	
5 ..	0.1	✓			✓		
6 ..	0.2	✓			✓		
7 ..	0.2	✓			✓		
8 ..	0.1	✓					
9 ..	Nil						

* *Cydia pomonella* L.

† *Eriosoma lanigerum* Hausm.

‡ *Bryobia praetiosa* Koch and *Tetranychus urticae* Koch.

aphis and mite control. Eight DDT schedules were tested; unsprayed plots were included to gauge codling moth activity within the experimental areas.

The nine treatments were as shown in Table 1. All sprays were prepared from emulsion concentrates.

RESULTS.

The trials were harvested at the end of March and the numbers of sound fruit and of those damaged by codling moth and light brown apple moth were determined; at intervals throughout the season all windfalls were similarly sorted. The combined results from these two determinations enabled fruit losses to be assessed on a total crop basis. A summary of the results is given in Table 2.

TABLE 2.

Schedule.	Experiment No. 1.			Experiment No. 2.		
	Percentage of Sound Fruit.	Percentage of Damaged Fruit.		Percentage of Sound Fruit.	Percentage of Damaged Fruit.	
		Codling Moth.	Apple Moth.		Codling Moth.	Apple Moth.
1. (6 cover sprays) ..	92.2	3.0	2.3	93.8	3.0	2.1
2. (4 cover sprays) ..	79.3	5.9	9.0	88.6	5.7	3.5
3. (3 cover sprays) ..	81.7	9.2	8.2	83.2	11.6	4.9
4. (4 cover sprays) ..	84.5	6.0	5.9	90.0	7.0	2.5
5. (2 cover sprays) ..	64.5	15.4	19.3	76.3	16.0	6.6
6. (2 cover sprays) ..	80.4	12.6	4.2	82.9	9.6	5.3
7. (1 cover spray) ..		Not used		86.8	7.8	4.3
8. (1 cover spray) ..		Not used		73.5	16.7	8.9
9. (no treatment) ..	56.6	27.3	16.9	61.5	27.2	10.6

The figures for codling moth damage in the above table are based on both stung and wormy fruit. Fruit in the former category are sound, the majority actually being marketable. The percentage stung of all codling moth damaged fruit in the total crop was highest for schedule 1 and decreased with the number of DDT sprays applied, being lowest for schedules 5, 8, and 9.

DISCUSSION.

Codling Moth.

In comparison with figures for previous seasons' experiments, codling moth infestation in the two experimental blocks can be classed as moderate. A persistent moth population was required to check adequately the efficacies of the several schedules under test, and the inclusion of the obviously inadequate schedules 5, 8 and 9 served a twofold purpose:—it enabled comparative evaluation of respective cover sprays, and also ensured an appreciable pest population throughout the season. Under such conditions, larger differences between the more effective schedules 1, 2 and 4 were more likely to occur.

The first cover spray, which was applied at the late spring peak of moth activity, is considered to fulfil an important role and was included in all schedules. Later sprays were applied when moths were relatively inactive, as shown by trapping records, and though the control exercised individually by these sprays was not great, their

combined effect appreciably supplemented the partial control obtained with the first cover spray. The first, second, fourth and fifth or sixth cover sprays are essential for control, and though the first and fourth cover sprays coincided with expected periods of major moth activity, they are not sufficient in themselves. The inclusion of cover sprays 2 and 5 or 6 greatly increased the efficacy of spraying. It seems that an effective schedule is one that, firstly, copes with the late spring peak of moth activity, and secondly, prepares for any reinfestation that may occur in midsummer and late summer.

The results also suggest that two applications of 0.2 per cent. DDT were of greater benefit than two similarly timed applications of 0.1 per cent. strength, but for the same DDT load on the trees, two 0.1 per cent. sprays three weeks apart were more beneficial than one application of 0.2 per cent. strength.

Light Brown Apple Moth.

Excellent control of this pest was obtained with the full cover spray schedule of six applications, but results with the other schedules differed from the corresponding degrees of control exercised against codling moth. These differences can be explained by pest behaviour. Both pests showed a peak of activity in late spring, but only the light brown apple moth was again very active throughout January. From an examination of the results, it is seen that the second and fifth cover sprays exercised considerable benefit against this pest, while the first and fourth cover sprays were of less importance for light brown apple moth control than they were for the prevention of damage by codling moth. Also, the greater benefit obtained by two applications of 0.2 per cent. DDT against this pest than against codling moth stresses the need for protracted tree protection during the all-important late spring and midsummer periods.

Mites.

Both experimental blocks received a dormant or semi-dormant oil spray followed by an application of hexaethyl tetraphosphate, plus spreader, in summer. Bryobia mite and red spider were active on experimental trees, though populations were not excessive. Differences were not apparent between the various DDT schedules employed, though unsprayed plots showed slightly less mite activity.

It was concluded that mite populations can be effectively controlled by the efficient application of both winter and early summer treatments, when DDT cover sprays are employed for codling moth control. Winter oil sprays reduce the overwintering mite populations, while a summer application of hexaethyl tetraphosphate, preferably early in December, prevents survivors of the winter treatment assuming pest proportions before cover spray applications cease.

Woolly Aphis.

This pest was of no importance in Experiment 1 but was prevalent in Experiment 2 early in the season and persisted until summer. Though DDT applications checked the activity of the parasite *Aphelinus mali* in the earlier parts of the season, woolly aphis did not increase in the several plots in conformity with frequency of DDT applications. Differences of infestation in the plots by midsummer

were rather a reflection of the order of severity of infestation that existed in early November. The combined effect of an application of hexaethyl tetraphosphate and increased parasite activity brought the pest under control by mid-January.

The future status of this pest is dependent on several factors, but these trials have shown that populations should be checked as early in the season as practicable, preferably by early summer. The helpful parasite, though present throughout the season, is never sufficiently numerous until mid or late summer to exert much influence on the pest population, and the use of an insecticide to supplement its influence is advisable. The early summer application of hexaethyl tetraphosphate for mite control will also prove beneficial in controlling woolly aphis, provided the spray is applied thoroughly at high pressure.

PRACTICAL APPLICATION OF RESULTS.

Further experimental work to finalise an orchard spraying schedule is planned for the 1949-50 season, but growers may wish to implement some of the suggested alterations to their pest control programme arising from last season's experiments.

These indicate that previously recommended spraying schedules concerning DDT applications may be reduced without prejudicing the control of codling moth and light brown apple moth populations following its use throughout the district.

DDT should be applied to cope with larval populations following peaks of moth activity. Cover sprays 1 and 2, three weeks apart, are sufficient to check the late spring codling moth infestation. These sprays will also serve to arrest early summer light brown apple moth damage.

Midsummer applications of DDT for codling moth control should be dictated by trapping records. Any increase in moth activity during early January should be followed by two applications of 0.1 per cent. DDT three weeks apart. If a definite peak of moth activity has not occurred by mid-January, then, to cover midsummer requirements against both codling moth and the light brown apple moth, these sprays should be applied as a routine measure.

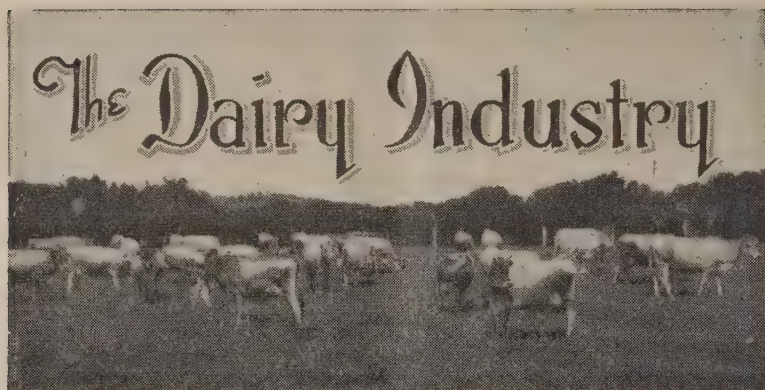
The measures used in the experiments for mite and woolly aphis control—namely, a dormant or semi-dormant oil spray and an early to mid-summer application of hexaethyl tetraphosphate with a thorough wetting of woolly aphis—appeared adequate and should be employed on orchards where DDT is used.

PROTECTION OF BIRD LIFE.

A number of new sanctuary areas under *The Fauna Protection Act of 1937* have recently been proclaimed and additional honorary protectors appointed.

Within sanctuaries, all native birds and animals, except certain declared pests, are totally protected at all times. It is an offence to shoot fauna for which such protection is provided, whether an open season has been declared or not, as an open season relates only to places outside of sanctuaries.

The Minister for Agriculture and Stock (Hon. H. H. Collins) has appealed to all persons to respect the sanctuaries throughout the State and thus ensure adequate protection for native birds and animals.



Pure Bred Herd Recording, 1948-49.

S. E. PEGG, Senior Adviser (Herd Recording), Division of Dairying.

THE number of pure bred cows submitted for production recording during the year showed a big increase over the number recorded during 1947-48, and owing to staff shortages it was necessary to reject applications for recording from a number of breeders. Altogether 149 breeders took part in the scheme, the number of owners according to the respective breeds being—A.I.S., 66; Ayrshire, 8; Friesian, 1; Guernsey, 10; Jersey, 64.

Table 1 shows a comparison between the numbers of cows of various breeds which completed lactations during the year and those in the previous year.

TABLE 1.
COWS COMPLETING LACTATIONS IN 1948-49 AND 1947-48.

Breed.	Number and Percentage of Cows.							
	Total.		Passed.		Failed.		Withdrawn.	
	1947-48.	1948-49.	1947-48.	1948-49.	1947-48.	1948-49.	1947-48.	1948-49.
A.I.S. ..	338	660	156 (46%)	314 (48%)	70 (21%)	140 (21%)	112 (33%)	206 (31%)
Ayrshire	18	43	7 (39%)	15 (35%)	6 (33%)	12 (28%)	5 (28%)	16 (37%)
Friesian	Nil	7	..	3 (43%)	..	..	..	4 (57%)
Guernsey	36	72	16 (44%)	42 (58%)	8 (22%)	12 (17%)	12 (33%)	18 (20%)
Jersey ..	492	645	242 (49%)	385 (60%)	116 (24%)	141 (22%)	134 (27%)	119 (18%)
Total..	884	1,427	421	759	200	305	263	363
Percentage	..	..	48%	53%	23%	21%	30%	25%

It will be noted that 53 per cent. of cows passed the required standards in 1948-49, compared with 48 per cent. in the previous year.

During the year the following production records for a 273-day period were established:—

A.I.S., Junior 3. W. H. Thompson's "Alfa Vale Model 29th"—
14,516 lb. milk, 691 lb. butterfat.

Jersey, Senior 4. C. W. & E. M. Barlow's "Wyreena Daisy Belle"—11,397 lb. milk, 599 lb. butterfat.

The average production for each age group of each breed for cows completing lactation during the year is shown in Table 2, from which it will be noted that the average production per cow irrespective of age was 6,783 lb. milk and 323 lb. butterfat, with an average test of 4.75 per cent. as compared with 6,981 lb. milk, 326 lb. butterfat, and an average test of 4.67 per cent. in the previous year.

Table 3 gives the average production for each age group of each breed for the period 1930-1948.

TABLE 2.

BREED PRODUCTION AVERAGES FOR REGISTERED HERD BOOK STOCK WHICH COMPLETED LACTATION RECORDS OF 273 DAYS DURING THE YEAR ENDING 30TH JUNE, 1949.

Breed.	—	J. 2.	S. 2.	J. 3.	S. 3.	J. 4.	S. 4.	M.	All Ages.
A.I.S. ..	No. of Cows ..	119	80	42	39	29	27	118	454
	Lb. Milk ..	6,717	7,126	7,650	8,161	8,002	9,296	9,322	7,912
	Lb. Butterfat ..	276	284	332	321	323	375	381	323
	Test % ..	4.11	3.98	4.34	3.94	4.03	4.03	4.08	4.08
AYRSHIRE ..	No. of Cows ..	12	..	2	..	2	8	8	27
	Lb. Milk ..	5,867	..	6,946	..	6,002	7,694	7,598	6,673
	Lb. Butterfat ..	250	..	289	..	253	317	314	280
	Test % ..	4.26	..	4.16	..	4.22	4.12	4.12	4.19
FRIESIAN ..	No. of Cows ..	..	..	..	..	1	..	2	3
	Lb. Milk ..	..	..	..	..	10,903	..	13,720	12,781
	Lb. Butterfat ..	..	..	..	..	372	..	460	430
	Test % ..	..	..	..	..	3.4	..	3.35	3.36
GUERNSEY ..	No. of Cows ..	11	11	3	5	4	3	17	54
	Lb. Milk ..	5,438	6,213	6,356	6,205	7,624	7,096	8,274	6,865
	Lb. Butterfat ..	273	292	312	231	343	341	426	334
	Test % ..	5.02	4.7	4.91	4.53	4.5	4.8	5.08	4.85
JERSEY ..	No. of Cows ..	175	72	49	39	22	37	132	526
	Lb. Milk ..	4,075	5,722	6,132	6,794	6,856	7,132	7,054	5,772
	Lb. Butterfat ..	276	297	321	359	358	375	367	323
	Test % ..	6.77	5.19	5.23	5.28	5.21	5.26	5.2	5.58

All Ages and all Breeds:—No. of Cows, 1,064; Milk, 6,783; Fat, 323; Test, 4.75%.

TABLE 3.

BREED PRODUCTION AVERAGES FOR REGISTERED HERD BOOK STOCK WHICH COMPLETED LACTATION RECORDS OF 273 DAYS BETWEEN 1930 AND 1948.

Breed.	—	J. 2.	S. 2.	J. 3.	S. 3.	J. 4.	S. 4.	M.	All Ages.
A.I.S. ..	No. of Cows ..	1,039	590	389	289	218	202	902	3,629
	Lb. Milk ..	6,807	7,277	7,712	8,622	8,373	8,893	9,706	8,056
	Lb. Butterfat ..	272	294	311	337	339	354	389	323
	Test % ..	4.0	4.04	4.03	3.9	4.05	3.99	4.00	4.0
AYRSHIRE ..	No. of Cows ..	59	30	27	44	12	14	82	268
	Lb. Milk ..	6,128	6,385	7,326	7,671	6,940	8,956	8,067	7,308
	Lb. Butterfat ..	343	255	289	301	284	365	326	292
	Test % ..	3.96	3.98	3.94	3.92	4.09	4.07	4.03	3.99
FRIESIAN ..	No. of Cows ..	39	20	15	6	3	8	23	114
	Lb. Milk ..	7,679	9,000	8,338	9,055	10,016	9,457	12,103	9,235
	Lb. Butterfat ..	295	328	303	330	337	364	435	338
	Test % ..	3.84	3.64	3.67	3.65	3.36	3.85	3.59	3.7
GUERNSEY ..	No. of Cows ..	38	35	27	12	6	5	24	147
	Lb. Milk ..	5,641	6,049	6,684	6,352	7,142	7,150	7,976	6,482
	Lb. Butterfat ..	280	290	334	314	351	369	39r	319
	Test % ..	4.96	4.79	5.0	4.94	4.92	5.16	4.91	4.92
JERSEY ..	No. of Cows ..	1,446	460	389	316	245	186	827	3,869
	Lb. Milk ..	4,962	5,492	5,903	6,322	6,526	6,801	6,999	5,853
	Lb. Butterfat ..	265	296	316	338	349	364	370	312
	Test % ..	5.34	5.38	5.36	5.34	5.34	5.35	5.29	5.33
RED POLL ..	No. of Cows ..	3	3	..	..	..	..	6	12
	Lb. Milk ..	5,293	6,122	..	..	..	..	7,373	6,540
	Lb. Butterfat ..	212	244	..	..	..	..	277	252
	Test % ..	3.99	4.0	..	..	..	..	3.75	3.86

A Survey of Herd Wastage and Other Factors on Queensland Dairy Farms.

S. E. PEGG and E. B. RICE, Division of Dairying.

DAIRYING in Queensland is spread over a large area of the coastal and sub-coastal parts of the State, with varying environmental conditions, pastures and fodder crops in the different districts. Thus information on dairying practices applicable to one district does not necessarily apply with respect to other districts. This article gives information obtained from a preliminary survey carried out with the co-operation of 122 farmers situated in widely different parts of Queensland in 1947-1948. The farms, which showed considerable variability in herd size, may be taken as representative of small, moderate and large dairy farms in the State. The co-operating farmers furnished a monthly return containing the requisite information for the carrying out of the survey.

From the data available from the survey, information was prepared on the following aspects of herd management:—

- (1) Wastage of dairy cattle.
- (2) The seasonal incidence of calving.
- (3) Calves reared and disposals of surplus calves.
- (4) Estimated carrying capacity of farms.
- (5) Estimated numbers of female stock kept per bull used.

The distribution of herds, according to districts, was:—

Darling Downs, 22; North Queensland (Atherton Tableland and Daintree), 6; Central Queensland (Rockhampton, Gladstone, Dawson, and Callide Valleys), 21; South-eastern Queensland (Gympie to New South Wales border and inland to the Dividing Range), 34; Central and Upper Burnett (Biggenden, Gayndah and Monto), 29; South Burnett (Nanango, Kingaroy and Murgon), 10.

Herd Wastage.

Wastage in dairy herds is of great importance in dairy farming economy. Wastage is considered here only in relation to the losses of stock from a herd through cullings for diseases, low production, and other factors which affect the economic usefulness of the animal or its productive life; it does not include wastage due to the sale of cows for use as producing units in other herds. It may be pointed out that surveys made in other countries have shown a surprisingly high annual replacement figure in the dairy cattle population of those countries. In various surveys made in different parts of England, the replacement rate in herds has been found to vary from 16 to 25 per cent., and in New Zealand it was ascertained from an extensive investigation carried out among herds which were production-recorded under the grade herd recording scheme that the annual percentage of cullings, &c., from herds was 17 per cent.

The overseas investigations have shown that the principal causes of disposals of cows from dairy herds fall within three major groupings:—

- (1) Sales of surplus stock. This is not strictly true wastage.
- (2) Low milk yield due to various reasons.
- (3) Failure to breed; that is, sterility due to various causes.

These three causes represented about 60 per cent. of the total disposals.

Wastage surveys give useful information which indicates the degree to which various methods of management, feeding and other factors exert an influence on the productive life of dairy cattle, and may aid in formulating control measures. It has to be remembered that before a dairy cow becomes a profitable unit in a herd she has been kept on the farm for about two years. Moreover, her production should steadily increase in each succeeding lactation period until maximum production is reached at about seven years of age, after which there is a gradual decline in the following years. It is obvious from the wastage data previously referred to that many cows are culled before maturity and hence before having attained maximum production. Clearly, serious economic losses must result if cows have to be culled even before reaching full production. After all, the economic cow is one which gives a good yearly production of milk or butterfat over a long number of years.

Table 1 sets out the total wastage of stock in the herds included in this survey.

TABLE 1.
HERD WASTAGE.

—	All Qld.	Downs.	N.Q.	C.Q.	S.E.Q.	C. and U. Burnett.	South Burnett.
Percentage of wastage including cattle sold for dairy purposes	19.6	17.9	24.9	22.1	18.1	22.3	9.5
Percentage of wastage excluding cattle sold for dairy purposes	13.1	10.1	14.4	16.5	14.5	12.9	8.1

It will be noted that cattle sold for dairy purposes constituted nearly one-third of the disposals. Omitting such sales, as cattle sold for dairy purposes are not lost to the industry, the true wastage, which was 13.1 per cent. for the whole State, is reasonably low in comparison with the results shown in similar surveys in other countries. The average life of a dairy cow in Queensland is thus calculated as 7.7 years; or, in other words, the average dairy cow in Queensland completes five lactation periods.

In Table 2 the wastage, excluding cattle sold for dairy purposes, is presented according to the various causes for culling of cows from the herds.

TABLE 2.

VARIOUS CAUSES OF WASTAGE, SHOWN AS PERCENTAGES OF TOTAL WASTAGE.

—	All Qld.	Downs.	N.Q.	C.Q.	S.E.Q.	C. and U. Burnett.	South Burnett.
Low Production ..	17	25	28	18	14	13	14
Aged ..	24	10	14	35	19	33	25
Udder Troubles ..	18	15	27	3	29	15	25
Brucellosis ..	7	23	5	4	2	2	..
Sterility ..	4	4	2	4	7	2	4
Calving Troubles	3	4	2	3	3	1	7
Tuberculosis ..	2	1	..	9	..	1	2
Accidents ..	4	4	5	4	4	2	5
Killed by Dingoes	1	1	1	3	1	1	..
Tick Fever ..	2	..	..	2	2	5	..
Other known Causes	10	6	4	11	9	16	13
Unknown ..	8	6	11	4	9	9	5

A perusal of the table reveals that low production, old age and udder troubles, which between them accounted for almost 60 per cent. of cullings, are the main causes of wastage of cows from Queensland dairy herds.

Some comment is necessary on the individual causes of wastage in certain districts. The high rate of culling for udder troubles in south-eastern and North Queensland was accounted for by the relatively high proportion of herds in these districts on farms supplying milk for market milk purposes; frequent laboratory testing of samples of milk in connection with the Milk Quality Control Scheme has led to an intensive check of herds on milk-supply farms for the purpose of excluding milk from cows affected with mastitis. The high percentage of cullings for tuberculosis in Central Queensland was due to the disposal of reactors in some of the herds included in the surveys. The apparently higher incidence of brucellosis, or contagious abortion, on the Darling Downs is difficult to understand, but is probably due to a greater amount of testing for this disease in this area.

Seasonal Incidence of Calving.

Investigations carried out in other countries have shown that there is an optimum time for calving, which is usually just before pastures commence their new seasonal growth. Cows calving at this time attain their maximum production when the pastures are in full growth, which ensures most efficient use of the pasture, the cheapest food for cows. In a recent investigation in Queensland (see this Journal for March, 1948), it was found that the average production of cows calving in the late winter and early spring (July to September, inclusive) was 30 lb. of butterfat per lactation above that of cows which calved between January and March.

The peak period of calvings is seen to be from October to January, inclusive, when 45 per cent. of the calvings occurred. Only 22 per cent. of the cows calved during July to September, the best period from the viewpoint of production in the ensuing lactation period. It should be pointed out, however, that the results for the survey year may not be truly representative of the normal monthly incidence of calvings among dairy herds in Queensland, as the calving times in a high proportion of

herds may have been delayed in 1947-1948 because of the serious setback suffered in the severe drought conditions of 1946-1947; dairy production in that year was slightly less than 50 per cent. of that of the record production year, 1938-1939.

The monthly incidence of calving is tabulated in Table 3.

TABLE 3.
PERCENTAGES OF CALVINGS IN EACH MONTH.

Month.	All Qld.	Downs.	N.Q.	C.Q.	S.E.Q.	C. and U. Burnett.	South Burnett.
July	7	9	6	6	9	4	10
August	7	8	4	7	10	3	7
September	8	9	8	7	10	7	8
October	10	8	6	13	10	10	8
November	12	10	10	13	14	13	11
December	13	11	8	11	11	19	11
January	10	9	7	9	10	13	11
February	7	9	9	7	5	8	6
March	8	8	11	9	6	8	7
April	6	9	10	6	5	6	7
May	6	5	10	6	5	4	8
June	6	6	11	6	5	5	5
No. of Calvings ..	6,120	1,191	307	979	1,637	1,516	490

Calves Reared and Disposal of Surplus Calves

Table 4 indicates the relative proportions of male and female calves born in the herds, and the percentages of female and male calves kept for rearing.

TABLE 4.
PERCENTAGES OF MALES AND FEMALES AND PERCENTAGES OF CALVES REARED.

—	All Qld.	Downs.	N.Q.	C.Q.	S.E.Q.	C. and U. Burnett.	South Burnett.
Heifers born ..	48.1	48.7	42.3	46.3	48.0	49.8	48.8
Bulls born ..	51.9	51.3	57.7	53.7	52.0	50.2	51.2
Heifers reared ..	70.5	69.4	64.8	77.2	67.4	79.5	43.1
Bulls reared ..	26.2	29.8	8.5	14.9	10.4	21.4	6.0

It is interesting to note that on a State-wide basis 70 per cent. of heifer calves were retained, and that, except for the South Burnett district, there was no marked variation from the mean in the various districts. This dispels any fear that insufficient calves are being reared on dairy farms for normal herd replacements.

The manner in which calves not kept for rearing were disposed of is shown in Table 5.

TABLE 5.
DISPOSALS OF CALVES NOT REARED, SHOWN AS PERCENTAGES OF ALL CALVES BORN.

—	All Qld.	Downs.	N.Q.	C.Q.	S.E.Q.	C. and U. Burnett.	South Burnett.
Sold (bobby calves)	32.0	35.0	26.0	27.0	25.0	34.0	62.0
Slaughtered ..	23.0	13.0	40.0	28.0	35.0	14.0	12.0
Died	1.5	2.3	1.9	1.1	1.2	1.3	1.2
Stillborn .. ..	.6	.4	.3	.2	.8	.4	.6

Stock Carrying Capacity of Farms.

An assessment was made of the numbers of acres required to maintain each head of dairy cattle according to district. This information is shown in Table 6.

TABLE 6.
ACRES PER HEAD OF DAIRY CATTLE.

District.	Average.	Range.
All Queensland	5.3	1.3 to 21.0
Darling Downs	6.6	3.3 to 11.4
North Queensland	2.5	2.0 to 3.5
Central Queensland	6.9	3.1 to 12.6
South-eastern Queensland	2.9	1.3 to 5.7
Central and Upper Burnett	7.0	2.0 to 21.0
South Burnett	4.4	2.4 to 7.3

Allowance has not been made for any portion of the farm used for the cultivation of cash crops, or other purposes than dairy cattle, which is quite appreciable in most dairying districts in Queensland, where dairying is so frequently associated with mixed farming. Because of the comparatively low number of farms in each district, the information given in this table is approximate only and, further, the stock-carrying capacity also varies widely even among farms in each sub-district.

Cows and Heifers per Bull.

Table 7 indicates the number of cows and heifers kept per bull. It is of interest to note the similarity of the figure in all districts.

TABLE 7.
NUMBER OF COWS AND HEIFERS PER BULL.

All Queensland	40
Darling Downs	38
North Queensland	29
Central Queensland	40
South-eastern Queensland	40
Central and Upper Burnett	46
South Burnett	40

With the rapid expansion of herd recording in Queensland, larger numbers of farms should be available for providing data for future surveys of this kind, but the information derived from the present survey should be of interest and value to the industry in focussing attention on some important aspects of dairy farming economy.



MORE HELP TO PIG RAISERS.

The Department of Agriculture and Stock plans to extend its advisory services to pig producers by placing an Adviser at Biloela early in the New Year. In announcing this, the Minister for Agriculture and Stock (Hon. H. H. Collins) said that the East Moreton, Darling Downs, South Burnett and Atherton Tableland areas already had district advisory officers, who were giving valuable aid to producers on problems of management, feeding and housing.

The new district would cover the important Rockhampton-Callide-Dawson Valley areas.

Feeding Dairy Cows in Spring.

ON the cover of this issue and below are pictures of sowings of skinless barley and Dun field peas made from April to July by Mr. H. Sinnamen on his farm at 17-mile Rocks on the Brisbane River. The value of a succession of sowings is evident from Plate 138, in which are shown, in the distance, the early planting being harvested for feeding to cows and, nearer the camera, patches in various stages of development. This land has been farmed for nearly 70 years.



Plate 137.



Plate 138.



Pulpy Kidney (Enterotoxaemia) of Sheep.

G. R. MOULE (Sheep and Wool Branch), G. C. SIMMONS (Animal Health Station, Yeerongpilly), and H. D. HALLAM (Sheep and Wool Branch).

PULPY kidney is a disease of sheep which is well known in the southern States of Australia, where it has been responsible for serious losses amongst both Merinos and crossbreds. Recently, however, it was diagnosed as the cause of mortality of fat lambs on the Darling Downs, and although there is nothing to suggest that it is a common disease in this State, sheep men would be well advised to seek the opinion of Departmental officers on any unusual deaths among their flocks.

The Cause of Pulpy Kidney.

The name enterotoxaemia which is often given to this disease indicates that it is a general poisoning of the system by a toxin formed in the bowel. It is an acute disease caused by a minute organism which is common in the soil and which, on being swallowed with the food, establishes itself in the bowel. In certain circumstances, all of which are not well understood, it forms a very potent poison which is absorbed into the blood stream and brings about very rapid death. In lambs, one of the most characteristic post-mortem findings is decomposition of the kidneys, which are typically dark and bruised in appearance and soon become pulpy.

The disease occurs most commonly in "flush" seasons and amongst sheep which are in prime condition. Accordingly, it is considered that the state of the digestive tract is an important contributing factor to the formation of the poison which is so highly fatal to sheep. However, the disease may occur amongst sheep which are depastured on dry feed and it has been reported from north-western New South Wales amongst Merinos grazing on dry Mitchell grass.

Pulpy kidney tends to be seasonal in nature and is seen most commonly among lambs grazing on winter cereal crops and amongst grass-fed animals in the spring.

Symptoms and Post-Mortem Findings.

The course of the disease is very rapid, death resulting in a few hours. Very few symptoms are noticed when Merinos in pastoral areas are affected: the animals are just found dead. When an outbreak occurs amongst lambs it is usually the fattest and most forward animals which are affected. Sometimes symptoms of giddiness and uncertainty

of gait are observed, but the animal soon goes down. Death may be uneventful, but in most cases it is rapid. Sometimes the lambs die in the "sleeping position"; sometimes there is struggling and frothing at the mouth. There may be some scouring shortly before death, with the faeces creamy in colour.

There are practically no unusual post-mortem findings if the examination is made immediately after death.

There may be engorgement of the blood vessels supplying the bowel, excessive fluid in the heart sac, and a few small blood spots on the inner and outer surface of the heart walls.

The carcase decomposes rapidly and a few hours after death the kidneys of lambs may be so soft that it is impossible to remove them intact from the carcase. In addition, there may be congestion of the lungs and gas formation in the bowel. The small intestines contain very little solid material and they are easily broken.

Diagnosis of Pulpy Kidney.

It is often difficult to diagnose the disease in the field. A history of losses from no other apparent cause is suggestive, but the age and condition of the sheep and the time when mortalities occur have to be considered. A definite laboratory diagnosis can only be made by examining specimens taken from lambs immediately after death, and in this regard sheep raisers would be well advised to seek the assistance of Departmental officers.

Prevention and Control.

When an outbreak occurs all dead sheep should be burnt to destroy the organism present in the intestine and the surviving animals should be fed a more fibrous ration. It may be necessary to feed cereal hay or chaff to introduce more fibrous bulk into the ration of lambs grazing succulent crops. Alternatively, the sheep may be given free access to pasture paddocks as well as to the grazing crops. Yarding for a few hours each day may be helpful in preventing losses. Trouble usually ceases in lambs as the result of the setback they receive at marking.

Enterotoxaemia in adult sheep is easily controlled by vaccination, and on properties on which trouble occurs frequently it is advisable to vaccinate the lambs at marking time. If losses are occurring prior to marking, it is advisable to vaccinate the ewes prior to lambing. Some of the immunity developed in the ewe is passed on to her lamb and will serve to protect it for the first month of its life. If it is desired to use this method, and the ewes have not been vaccinated previously, it is necessary to give them two injections, the second being made within about two weeks of lambing.

GRAINS AND SEEDS FOR WESTERN AUSTRALIA.

Grain and seeds of a number of Queensland crops will need to be accompanied by a special certificate from the Queensland Department of Agriculture and Stock before they will be admitted to Western Australia.

Maize, sunflower, sorghums, Sudan grass, millets, cowpeas and peanuts must be certified free of Bathurst burr, Noogoora burr, mint weed and thorn apple (*datura*) before export to the west. Properly drawn samples should be submitted to the Standards Officer of the Department of Agriculture and Stock for examination.



Spaying of Cattle.

PREPARED IN THE DIVISION OF ANIMAL INDUSTRY.

THE practice of spaying female cattle is adopted as a method of culling inferior or cast-for-age cows from the breeding herd. Though it is at present more or less confined to beef animals, spaying as a means of disposing of the unprofitable cows in dairy herds for butchering is worthy of consideration.

The operation may be carried out on females of all ages from five months. It may be performed at any time of the year, but it is preferable to limit spaying by the flank method to the cooler months and when pastures are adequate.

ESSENTIALS IN SPAYING.

Irrespective of the age at which spaying is carried out and of the method used, the following fundamental requirements should be observed:—

- (1) Feed and water should be withheld from the cows for at least 12 hours and preferably 24 hours before the operation, in order to ensure that the beasts are empty.
- (2) The animals must be kept quiet and cool.
- (3) It is advisable to avoid spaying when animals are pregnant or in a feverish condition.
- (4) Spaying should not be carried out under dirty conditions.
- (5) The animals must be held under adequate restraint.
- (6) The instruments must be in good order and sterilized.
- (7) The operation should be performed neatly and completely. Excessive speed is the cause of many failures.
- (8) The animals should be kept as quiet as possible for at least 10 days after spaying.

METHODS OF SPAYING.

Spaying may be effected by three methods:—

- (1) Through the ventral (lower) surface of the abdomen.
- (2) Through the vagina or female passage.
- (3) Through the flank.

Spaying Through the Abdomen.

This method is the best to use for calves and small and young heifers.

Equipment Required.

Clippers or pair of curved scissors; sharp knife; spaying emasculator or ecraseur; several strong curved needles; strong suture thread; hoist and gambrel.

With this method, as with the others described later, the instruments should be sterilized by boiling in water for at least 10 minutes, and such sterilization repeated from time to time. To keep the instruments reasonably safe while in use, they should be put into 5 per cent. "Dettol" or some other reliable antiseptic solution. The operator's hands should likewise be kept clean by washing in the solution.

Method of Operating.

The animal is roped, taken close to the hoist, thrown, and the hind legs placed separately in the two loops formed by the rope passing through the holes in the gambrel. The main hoisting rope is now pulled (which tightens the rope around the pasterns) and the animal's hind-quarters raised off the ground, leaving the shoulders, neck and head, however, still on the ground so that they may be held by an assistant. Another assistant clips off the hair over an area of about a few square inches just in front of the teats and in the middle line. The clipped area is cleaned with methylated spirits, and tincture of iodine applied.

The operator now makes an incision about 1 inch long in the middle line just in front of the front teats and right through into the abdominal cavity. Two fingers are then inserted; one horn of the uterus is grasped, drawn out until the ovary is exposed, the ovary removed with the emasculator, and the horn of the uterus replaced. The other horn is picked up in a similar manner, the ovary removed, and the horn replaced. Two or three interrupted stitches close up the wound, which is smeared over with some reliable antiseptic dressing. The main hoisting rope is released, the gambrel coming down, the loops of rope are removed over the feet, and the animal is at once released.

Beyond removal to a paddock close by, no further attention is required.

Passage Spaying.

This method of spaying is the one generally adopted for cows and is preferable to the flank method. With heifers, however, the vagina is too small to admit the hand and instruments.

The operation is performed in the standing position. Any of the following methods of restraint can be used:—

- (1) Placing the cow in an ordinary dairy bail.
- (2) Placing a rope around the cow's horns and pulling her up to a fence.
- (3) Placing the cow in an ordinary cattle crush, the animal's head being tied securely by a rope around the horns.
- (4) Placing the cow in a specially constructed cattle crush, such as can be seen on any cattle run where spaying of cows is extensively carried out. This type of crush is so constructed that the cow's head is held firmly in a special bail, and while there is little lateral movement the operator has ample room for working.

Equipment Required.

Spaying emasculator or ecraseur;
Special spaying knife;
Depressor.

As previously mentioned, the instruments must be well sterilized in boiling water, a liberal supply of which should always be available, as well as clean cold water. A quantity of 5 per cent. solution of lysol or phenol solution should be on hand in which to keep the instruments while operating.

The animal in position, an examination is made, especially with dairy cows, to ascertain if there is any discharge from the uterus or any signs of acute vaginitis. Should the vaginal cavity be normal, it is advisable not to douche it out; if, on the other hand, it is abnormal, involving either of the above conditions, it is advisable to put off the operation until some future date, placing the animal under a course of treatment. When this is not possible, the vaginal cavity should be well douched out with a weak disinfectant solution before operating.

Method of Operating.

An assistant takes the cow's tail and washes around the anus, vulva and buttocks with a 5 per cent. antiseptic solution. The operator, having washed his hands and arms in a 2 per cent. disinfectant solution, passes the left hand into the vaginal cavity. The depressor, held in the right hand, is passed into the vaginal cavity along the left arm, the ring being placed on the mouth of the womb, with the convex surface of the curve upwards. Pressure is applied and the vaginal wall made firm. The left hand is withdrawn and takes the depressor, pushing it firmly forward, while the right hand with the spaying knife is introduced into the vaginal cavity. The blade is thrust through the wall by a sudden stab, an incision about 1 inch being made about 2 or 3 inches above the mouth of the womb. Both the wall of the vagina and the peritoneum must be cut, otherwise the operator will not be able to reach the ovaries.

The incision being completed, the knife and depressor are withdrawn. Two fingers of the left hand are inserted into the incision, forced through into the abdominal cavity, and one ovary seized. This is withdrawn through the opening and placed through the jaws of the spaying emasculator, which has been introduced with the right hand. The attachment of the ovary is now crushed and the ovary placed on the floor of the vagina. The two fingers of the right hand are again inserted into the abdominal cavity and the other ovary seized and crushed off in the same way. Both ovaries are now withdrawn, together with the emasculator, and the operation is complete.

No special after-care is required, but spayed animals should be allowed to rest as much as possible for at least 10 days. If properly performed, under clean conditions, the loss is nil. Complications such as haemorrhage and septic peritonitis are, however, possible. Bloating may also be seen occasionally after spaying, but this is not serious and soon disappears.

Flank Spaying.

While this is the oldest, it is also the easiest method of spaying and is the one generally adopted with heifers. Many cows are also spayed by this method, but passage spaying is preferable for them.

The standing position is to be preferred and should always be adopted where suitable yards and crushes are available. Such a crush is so devised that the animal can be held between a pair of gates so that the movement of the body is reduced to a minimum. In one of these gates, nearly always the left hand one, there is a trap gate large enough to allow the operator to work on the site of the operation. Rails are placed under the brisket and abdomen to prevent the animal going down while operating. By this method, where there is more than one set of gates, large numbers of heifers can be spayed quickly. There are many different types of these crushes, but they have the one objective, namely, keeping the animal's body as still as possible.

Spaying may be carried out with the animal thrown and stretched out on the ground in a position similar to that used for branding. The method of operating is as described for the standing position, but as the recumbent method of restraint has nothing to recommend it, it is very seldom adopted.

Equipment Required.

The equipment required for this operation consists of :—

Sharp knife;	Artery forceps—optional;
Spaying emasculator;	Needle forceps—optional;
Reel of strong cord;	Several good, sharp, strong, slightly
Pair of clippers;	curved needles.

Have also on hand tincture of iodine, a good supply of 5 per cent. disinfectant solution, soap and towel. All instruments must, of course, be well sterilized by boiling and be reboiled from time to time and kept in a strong disinfectant solution while in use.

The Site of Operation.

The operation may be performed on either side, but the left side is most frequently selected. On this left side there is only the rumen, while on the right there is a mass of bowel. Whatever side is selected the site of the operation is always the same, namely, that portion of the side of the abdominal wall midway between the last rib and the prominent bone commonly known as the hip bone.

Method of Operating.

Clip the hair off the site of operation; rub well with strong anti-septic solution, and dry and paint the area with tincture of iodine. An incision about 3 to 4 inches long is made in a downward direction through the skin, midway between the last rib and the hip bone. The fibres of the outer muscle are noted running downwards and backwards. These are divided either with the scalpel or the fingers, the incision preferably made with the scalpel, and then enlarged along the direction of muscle fibres with the fingers. Those fibres of the next muscle are now exposed and these are likewise incised in the opposite direction. The peritoneum or inner layer is now exposed, punctured with the scalpel and then enlarged by tearing, exposing the rumen.

The operator, standing with his back to the animal's head, inserts the left hand through the incision backwards and downwards over the rumen to that point where the brim of the pelvis turns upwards. Here the right ovary can be felt hanging from its appendages. It is

usually about the size of an almond nut in heifers and larger in cows, when normal; however, if it is cystic it may be much larger. The ovary is seized between two fingers and placed between the jaws of the emasculator, which is inserted by the right hand along the left arm. This ovary having been detached from its appendages, the left hand is either withdrawn to drop the ovary outside or placed across and takes up the left ovary, which is likewise placed between the jaws of the emasculator and cut off. The emasculator and ovaries are now withdrawn. If the ovary is not withdrawn care must be taken not to drop it within the abdominal cavity as it may graft onto the peritoneum.

The wound of the skin is closed with a few interrupted stitches; no muscles stitches are required. Beyond applying some reliable antiseptic dressing, no further treatment is required. Some operators recommend removal of the stitches in about 12 days, but this is not necessary unless, of course, some complications have developed. These may be septic peritonitis, haemorrhage or local abscesses.

WARNING ON THE USE OF SODIUM FLUORIDE.

The Veterinary Services Branch of the Department of Agriculture and Stock advises pig farmers not to give sodium fluoride to pigs in liquid form.

This new remedy for worms has given excellent results when mixed with ground grain or ready mixed mashes, as this allows the medicine to be slowly absorbed by the animal. A case has recently come under notice where a Darling Downs farmer fed sodium fluoride to his pigs in diluted molasses. This method of giving the medicine resulted in a very quick uptake of the chemical and several pigs were lost through poisoning.

The use of sodium fluoride is very effective and quite safe if the sodium fluoride is incorporated in dry feed equivalent to a full day's ration computed on the basis of 1 lb. of dry feed to each 25 lb. liveweight of pig.

TUBERCULOSIS-FREE CATTLE HERDS (AS AT 1st NOVEMBER, 1949).

Breed.	Owner's Name and Address of Stud.
Aberdeen Angus	The Scottish Australian Company Ltd., Texas Station, Texas.



Breeds of Fowls.

P. RUMBALL, Officer in Charge, Poultry Branch.

(Continued from page 306 of the November issue.)

STANDARDS.

IN order to maintain breed characteristics it is essential to have standards to which to breed. Thousands of fowls are bred yearly by producers with little or no consideration being given to type. The departure from type may be attributed in some degree to the exaggerated specimens at times seen on the show bench, and to greater consideration being given by judges to feather markings than to types and egg-producing qualities.

From the one breed in many instances there have been developed two types; namely, the standard-bred fowl and the utility-bred fowl. In trying to perfect his bird from a show point of view the fancier sacrificed egg qualities, while the egg producer in the race to produce eggs sacrificed type. The egg producer sacrificed type to such an extent that commercial breeders years ago drew up a utility poultry standard to be read in conjunction with the standard of perfection as laid down by the Poultry Club of England.

This move has proved of great advantage to the industry, since the improvement in type that has taken place has materially assisted in maintaining the health and stamina of our flocks.

LEGHORNS (Plates 139 and 140).

General Characteristics.

THE COCK.

Head.—Skull fine. Beak stout, the point clear of the front of the comb. Eyes prominent. Comb (a) single or (b) rose: (a) perfectly straight and erect, large but not overgrown, deeply and evenly serrated (the spikes broad at their base), extending well beyond the back of the head and following, without touching, the line of the head, free from "thumb marks" or side spikes; (b) moderately large, firm (not overgrown so as to obstruct the sight), the leader extending straight out behind and not following the line of the head, the top covered with small coral-like points of even height, and free from hollows. Face smooth. Ear-lobes well developed and rather pendant, equally matched in size and shape, smooth, open, and free from folds. Wattles long and thin.

Neck long, profusely covered with hackle feathers.

Body wedge-shaped, wide at the shoulders and narrowing slightly to root of tail; round and prominent breast; long back sloping slightly to the tail; large wings tightly carried and well tucked up; moderately full tail at an angle of 45 degrees from the line of the back.

Legs moderately long. Shanks fine and round (flat shins objectionable) and free of feathers. Toes (four) long, straight, and well spread.

Carriage very sprightly and alert. There should be no suggestion of stiltiness.

Plumage of silky texture, free from woolliness or excessive feather.

Handling, firm with abundance of muscle.

Weight not less than 6 lb.



Plate 139.
WHITE LEGHORNS.

THE HEN.

With the exception of the comb (in the single-combed varieties falling gracefully over either side of the face without obstructing the eyesight) and the tail (carried closely and not at such a high angle), the general characteristics are similar to those of the cock, allowing for the natural and sexual differences. Weight not less than 5 lb.

Colour.

Beak yellow or horn. Eyes red. Comb, face, and wattles bright red. Earlobes pure opaque white (resembling white kid) or cream, the former preferred. Legs and feet yellow or orange.

THE BLACK.

Plumage.—Rich green-black or blue-black, the former preferred, and perfectly free of any other colour.

THE BROWN.

Plumage of the Cock.—Neck-hackle rich orange-red, striped with black, crimson-red at the front below his wattles. Back, shoulder-coverts, and wing-bow deep crimson-red or maroon. Wing-coverts steel-blue with green reflections forming a broad bar across; primaries brown; secondaries deep bay on the outer web (all that appears when the wing is closed) and black on the inner. Saddle rich orange-red with or without a few black stripes. Breast and under-parts glossy black, quite free from brown splashes. Tail black glossed with green; any white in tail is very objectionable. Tail-coverts black edged with brown.

Plumage of the Hen.—Hackle rich golden-yellow, broadly striped with black. Breast salmon-red, running into maroon around the head and wattles, and ash-grey at the thighs. Body colour rich brown, very closely and evenly pencilled with black, the feathers free from light shafts, and the wings free from any red tinge. Tail black, outer feathers pencilled with brown.

THE WHITE.

Plumage.—Pure white free from straw tinge.

Scale of Points.

THE BLACK.

Head (comb 12, lobes 15)	..	..	..	..	..	27
Colour	..	..	..	..	..	25
Type	..	..	..	..	..	15
Size	..	..	..	..	..	15
Condition	..	..	..	..	..	10
Legs	..	..	..	..	..	8
						<hr/> 100

THE BROWN.

Head (comb 12, lobes 16)	..	..	..	..	..	28
Colour	..	..	..	..	..	20
Type	..	..	..	..	..	15
Size	..	..	..	..	..	15
Condition	..	..	..	..	..	12
Hackle	..	..	..	..	..	10
						<hr/> 100



Plate 140.
BROWN LEGHORNS.

THE WHITE.

Type	..	..	..	..	..	25
Head (comb 10, lobes 10)	..	..	..	..	..	20
Colour	..	..	..	..	..	20
Size	..	..	..	..	..	15
Condition	..	..	..	..	..	10
Legs	..	..	..	..	..	10
						<hr/> 100

Serious Defects.—Cock's comb (single) twisted or falling over, or hen's comb erect; rose comb such as to obstruct the sight; ear-lobe red; any white in face; legs other than yellow or orange; wry or squirrel tail; any bodily deformity. In blacks, dark legs or eyes. In browns, white feathers.

As far as is known, the leghorn originally came from Italy, its name being derived from a town in that country. The characteristics of the present-day Leghorn have been largely fixed by American and English breeders as a result of most careful selection over a long period of years.

There are many varieties of Leghorns, e.g., White, Brown, Black, Buffs, Pile, Blue, Exchequer, Cuckoo, Duckwing (silver and gold), and Mottled.

The Leghorn, more particularly the White Leghorn, is possibly the most popular breed or variety of fowl in the world; it has maintained this position for at least half a century, and has done so principally due to its prolificacy. Other characteristics of the breed are that it comes into production early in life, and is most active and alert.

Although there are a large number of varieties of Leghorns, the White stands supreme in the commercial poultry world, followed in order by the Brown and the Black.

The table quality of the flesh of this breed is not considered equal to that of heavy breeds, although young cockerels meet a fair demand.

With regard to size, there are two extremes which are likely to occur when breeding either for exhibition or for egg production. When breeding for the former, the general tendency is to increase the size of the breed. This does just as much harm to the Leghorn as breeding from undersized birds by the commercial poultry farmer striving for egg production. These factors should not be lost sight of when selecting the breeding pen. Under these circumstances, it is advisable to always bear in mind the standard weights as laid down and be just as harsh with a bird that is overweight as with one that is underweight.

Varieties.

The White.—Possibly this variety will always remain supreme in the Leghorn family because of the ease with which it can be bred for egg production and also for exhibition. When selecting birds for breeding, the individual birds should be balanced up by first giving consideration to type, avoiding any exaggerated characteristics. When the actual egg production is known, there is a general tendency to breed from high producers, irrespective of body conformation. This situation is possibly more common among White Leghorns than among all other fowls, as a greater number are tested for egg production.

The Brown.—This variety is difficult to breed true to type and colour. Its popularity has declined of recent years, but some commercial poultry farmers continue with the breed and claim that the hens are equal to White Leghorns as layers.

To produce exhibition cockerels it is necessary to mate an exhibition male with a female that is much too dark for exhibition purposes. To breed exhibition females, matings have to be reversed, mating together an exhibition female and a male very light in colour.

It is generally recognised among the poultry fanciers that the exhibition female line are indifferent layers, whilst the females of the exhibition cockerel line are quite good layers. As a commercial proposition the latter could be fostered.

Another fault which is fairly common in Leghorns, but possibly more pronounced in Brown Leghorns, is the eye colour, or the colour of the iris. It should be red, but there is a tendency towards straw colour, and even green. The latter is a very serious fault, because of the associated tendency towards shortsightedness or blindness. Birds that are short-sighted cannot be profitable and this loss of eye-colour might be associated with leucosis.

The Black.—The Black Leghorn is a good layer, but difficult to breed true to colour. Some breeders resort to double matings for exhibition purposes, but good laying strains could hardly be built up upon this principle. Birds with a good green sheen, free from purple and white in undercolour, should be selected for breeding purposes. White in undercolour is a serious defect which increases with age. Cock birds, sound in undercolour, are particularly valuable. White in wings of young stock is not uncommon, but disappears with the growth of adult plumage.



Plate 141.
THE ANCONA.

**ANCONAS (Plate 141).
General Characteristics.**

THE COCK.

Head.—Skull moderately long, deep, and inclined to width. Beak of medium length and moderate curve. Eyes prominent. Comb (a) single or (b) rose: (a) upright, of medium size, with deep serrations and five to seven spikes (broad at their base), the outline forming a regular convex curve, the back following the line of the head, free from "thumb marks" or side spikes; (b) medium size, low and

square front, tapering towards the leader (which should follow the curve of the neck and not be straight out or upwards), the top covered with small coral-like points of even height, and free from hollows. Face smooth. Ear-lobes inclined to almond shape, of medium size, and free from folds. Wattles long and fine.

Neck.—Long, profusely covered with hackle.

Body.—Moderately long, with close and compact plumage, broad front, slightly narrow saddle; full broad breast carried upwards; large wings well tucked up; full tail carried well out.

Legs.—Moderately long. Thighs well apart and almost hidden by the body feathering. Shanks and feet free from feathers. Toes (four) rather long and thin, well spread.

Carriage.—Upright, bold, and active.

Weight.—6 lb. to 6½ lb.; cockerels, 5½ lb.

THE HEN.

With the exception of the single comb, which falls, without obscuring the vision, on one side of the face, the general characteristics are similar to those of the cock, allowing for the natural sexual differences. Weight, 5 lb. to 5½ lb.; pullet, 4½ lb.

Colour.

Beak yellow, shaded with black or horn, preferably not wholly yellow. Eyes orange-red with hazel pupil. Comb, face, and wattles bright red, the face free from white. Ear-lobes white. Legs and feet yellow mottled with black.

Plumage beetle-green with white tippings (the latter free from black or grey streaks), the more evenly V-tipped throughout with white the better, but tipped and not laced or splashed. Under-colour black. All the feathers should be black to the roots, with beetle-green surface, and only the tips white.

Scale of Points.

Colour and markings: purity of white, quality and evenness of tipping, 20; beetle-green ground colour, dark to skin, 15						
Head (comb 10, eyes 5, beak 5, lobes 5)	..	..	..	..	..	35
Type and carriage	..	..	..	..	..	25
Texture, general	..	..	..	..	..	15
Legs, colour	..	..	..	..	..	10
Condition	..	..	..	..	..	5
Size	..	..	..	..	..	5
						100

Serious Defects.—White in face; white or light under-colour; plumage other than black and white; any deformity.

This breed is believed to have originated in Ancona, in Italy.

They are extremely hardy, quick growers, great foragers, and layers of white-shelled eggs. A notable feature of the Ancona is its highly nervous temperament. It is a very handsome, interesting breed, that will more than pay its way commercially. As a table fowl the Ancona is equal to the Leghorn in quality of flesh.

As regards type, they somewhat resemble the Leghorn, though smaller and lower set, being shorter in thigh. The back is somewhat shorter and not so straight, whilst a characteristic feature of the breed is that the fulness of breast is carried higher than in the Leghorn.

The colour is not just black and white splashes, but calls for white tipping on a black background. The standard calls for feathers to be "V" tipped, but the size of the "V" is not defined. This leaves much to the discretion of the breeder. Tipping should be clearly defined without being splashed with black or grey. White flights are fairly common, and very difficult to breed out when aiming at obtaining correctly tipped birds, and due allowance can be made for such a fault.

Light undercolour is a fairly common fault; it is classified as a serious defect and must be considered as such. Undercolour should be dark right to the skin. The ideal leg colour is yellow mottled with black. Look for definite black mottled (or spots), not patches of black shading; yellow must predominate (yellow mottled with black).

In breeding it is better to use a male with clean yellow legs than one in which the black predominates; the latter will tend to produce a preponderance of black legged females.

MINORCAS (Non-sitters).

General Characteristics.

THE COCK.

Head.—Skull sufficiently long and broad to provide a substantial foundation for the comb. Beak stout, fairly long. Eyes full, bright, and expressive. Comb (a) single or (b) rose: (a) medium size, perfectly straight, upright and rigid, not extending over the point of the beak, the back following without touching the line of the neck-hackle, nicely arched, and evenly serrated with preferably five wedge-shaped spikes, free from "thumb marks" or side sprigs; (b) medium size, firm, low, and square front, oblong shape, tapering towards the leader (which should follow the curve of the neck and not be straight out or upwards), the top covered with small coral-like points of even height, free from hollows. Face smooth, the skin taut (wrinkles objectionable), as free as possible from feathers or hairs. Earlobes almond-shaped, medium size, widest part on the top, more elongated than round, of kid-like texture, flat and of firm substance, fitting closely to the head and not extending over the face, and without any tendency to hollowness, slackness, or roundness. Wattles long, of oval shape, and fine texture.

Neck.—Long, hackle extending well down to body.

Body.—Broad-shouldered, fairly long, and compact with a deep keel and straight breastbone; horizontal carriage; rather long back; full round breast; fairly long wings carried closely to the sides and with broad flight feathers; fully furnished tail with long, broad, and nicely curved sickles, and set on at an angle of 45 degrees.

Legs.—Of medium length, but without any tendency to stiltiness. Shanks strong but fine bone, free of feathers, straight and wide apart, no tendency to "knock-knees." Toes (four) long, fine, and well spread.

Carriage.—Upright, active, and alert.

Weight.—6 lb. to 8 lb.

THE HEN.

With the exception of the single comb (which is carried gracefully over one side so as not to obstruct the sight), the general characteristics are similar to those of the cock, allowing for the natural sexual differences.

Weight.—5 lb. to 7 lb.

Colour.

THE BLACK.

Beak dark horn. Eyes dark. Comb, face, and wattles blood-red, the face totally devoid of white or blue skin. Earlobes perfectly white. Legs and feet black or very dark slate, the latter in adult birds only.

Plumage.—Brilliant green-black.

THE WHITE.

Beak white. Eyes red. Comb, face, and wattles blood-red. Earlobes white. Legs and feet pink-white.

Plumage.—Lustrous silver-white.

Scale of Points.

The Single Comb.

Head (face 15, comb 15, lobes 10)	..	..	..	40
Colour (plumage 10; legs, eyes, and beak 8)	..	..	..	18
Type	..	..	..	17
Size	..	..	..	15
Condition	..	..	..	10

100

Serious Defects.—White or blue in face; wry or squirrel tail; feathers on shanks or toes; other than four toes; side sprigs on comb; plumage other than black or white; legs other than black or dark slate in Blacks; or white in Whites.



Plate 142.

MINORCAS.

There is little known of the origin of this breed. It is generally accepted that the Minorca is a descendant from the Castilian fowl. Its name is derived from the Island of Minorca, off the East coast of Spain, from where the first importations into Britain were made.

The Minorca has the inherent characteristic for good egg size. It is generally accepted that the average weight of eggs laid by this breed is greater than that of eggs laid by most other breeds.

The Minorca is possibly the largest of the Mediterranean or light breeds, and being white skinned is attractive when dressed for table purposes. However, its black pin feathers are objectionable.

The Minorca, although well known, has not been persevered with to any extent by commercial poultry farmers. Backyard poultry keepers who have a preference towards white shelled eggs would find the Minorca admirable for this purpose.

This breed is noted for its long back, the shoulders being broad and the body reasonably deep and having somewhat of an oblong, compact appearance, as the feathering is fairly close. The male has a sloping back, with a reasonably long flowing tail which sets off its body and gives it a somewhat racy and active appearance. The back of the female is nearly horizontal, and the tail carried fairly low.

The breed is also noted for the large combs, wattles, and the outstanding characteristic of large white earlobes. The comb should not be excessively large and beefy. Smallness of earlobes is another common fault, more particularly among the utility Minorcas.

Varieties.

The Black (Plate 142).—The black is common in Queensland. Little difficulty is experienced in breeding this variety, but there are some characteristics that must be guarded against. Some of the principal faults are as follows:—Light coloured eyes, such as reddish or hazel, in-knees, light undercolour, small lobes.

There is also a tendency towards white in face or blue in face, but these points are not quite so common as those previously mentioned. The standard calls for a brilliant green sheen on the plumage. The plumage, as a general rule, particularly in the female, is a dull black colour. At one time purple sheen, or barring, was fairly prevalent. This fault has been practically bred out, but should always be avoided where possible in the selection of breeding stock.

The White.—This variety is very uncommon in Queensland.

[TO BE CONTINUED.]



MEMBERS OF THE WARWICK JUNIOR FARMERS' CLUB WITH LOCAL SUPPORTERS.

MARKETING

Stabilising the Wheat Market.

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"THE Wheat Market." What visions the phrase conjures up of hectic buying and selling in the great grain exchanges of the world! Chicago! The Baltic! Of fortunes made and lost. The fever that grips the operator when sudden price movement, or news of quick change in supply or demand prospects, holds promise of handsome profit for prompt action in the right direction, or heavy loss for the ill-informed or unlucky speculator. The "Bulls" and the "Bears"; "Hedges" and "Futures." This coloured the picture of a not so distant generation. It was reflected in popular fiction. The system was motivated by the hope of gain, and held an appeal for the adventurous. The welfare of the producer and of the consumer had no conscious place in such a system of trading, but it nevertheless served a necessary purpose. By its operation production was equated with demand, value was ascertained, and the international flow of wheat was rendered possible. If the benefits accruing to the producer and the consumer were purely incidental, they were none the less real.

However, the system was shown to have its limitations. Two world wars with an intervening economic depression have demonstrated that speculative trading in wheat is unable of itself to meet national needs in abnormal times. In fact, its suitability for the needs of the modern world has been called into question. Wheat means bread, the staple food of Western peoples and of an increasing number of Asians. In time of war it becomes as important as armaments, and in times of peace its importance as a vital foodstuff is such that its regular supply cannot be allowed to fail because for a period it may become uneconomic for farmers to produce wheat.

During the depression years, wheatgrowing in Australia became so unprofitable that the Federal Government paid to wheatgrowers in bounties and other forms of assistance a sum of over £18,700,000 during the years 1932 to 1940. Wheatgrowers in other countries were likewise assisted by their Governments at that time; for example, the New Deal legislation for agriculture in the United States.

From that time unremitting efforts have been made in Australia and in other wheat exporting countries to stabilise their wheatgrowing industries and to bring about an international agreement covering the trading in wheat.

Difficulties have been encountered in both the national and the international spheres because of the conflicting interests involved, but the position has been reached this year when a Wheat Industry

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Stabilisation Scheme will operate in Australia concurrently with an International Wheat Agreement between certain of the wheat exporting and wheat importing countries.

In Australia, the Wheat Industry Stabilisation Scheme, which replaced the wartime scheme operated under the National Security Act, is based upon complementary legislation passed by the Commonwealth and State Governments in 1948 after the proposals had received an affirmative vote of wheatgrowers.

The scheme, which is without the acreage limitations of the wartime plan, is to operate for a period of five years up to the end of the 1952-53 season. It provides that the Commonwealth Government for its part shall guarantee the price of wheat placed on the export market through the Australian Wheat Board and the Board's licensed receivers in the States.

The guaranteed price shall be on the basis of 6s. 3d. per bushel f.o.r. ports, bulk basis, the ascertained cost for the 1947-48 season for wheat grown and delivered by wheatgrowers; with variations according to an index of production costs for each season starting with the 1948-49 crop. The guaranteed price for the 1948-49 season has been fixed at 6s. 8d. per bushel f.o.r. ports, bulk basis. The guarantee is for a maximum of 100 million bushels from any one season's crop. A stabilisation fund has been established by means of a tax on wheat exported. This is paid into the fund to help meet the guaranteed price. If it is insufficient, the Commonwealth Treasury has to pay the balance. The tax applies when the export price is higher than the guaranteed price, and consists of 50 per cent. of the difference between the two prices, but is not to be greater than 2s. 2d. a bushel.

The States for their part undertake to fix a home consumption price for wheat at the same level as the export price guaranteed by the Commonwealth.

In the international sphere, substantial agreement has been reached by the importing countries and by a majority of the exporting countries with the result that an International Wheat Agreement (excluding Argentina, Russia and the Danubian countries) has been signed by the representatives of 5 exporting countries and 36 importing countries.

The agreement, which follows an unsuccessful attempt to reach agreement in 1948, is for a period of four years dating from the 1st August, 1949, and covers a quantity of 436 million bushels (or slightly less) of wheat annually. This is only approximately half, or not half, of the international trade in wheat, which may vary from 750 million bushels to 1,000 million bushels each year.

However, it is a beginning and has been described by the United States Department of Agriculture as an attempt, by introducing an element of stability into the world wheat trade, to overcome the hardship caused to producers and consumers by burdensome surpluses and critical shortages of wheat. The five exporting countries include France and Uruguay, but they account for only 5 million bushels of the export total between them. The others are Canada, with a quota of 203 million bushels; the United States, with 168 million bushels; and Australia, with 80 million bushels.

Of the 36 importing countries which have signed the agreement, the United Kingdom, with over 177 million bushels, has by far the largest annual import quota. Other countries with 20 million bushels, or more, are Italy, 40 million; India, 38 million; Netherlands, 25 million; and Belgium, 20 million.

The agreement provides for basic maximum and basic minimum prices, with the minimum decreasing on a sliding scale until the conclusion of the agreement in 1952-53. Taking transportation costs and exchange rates into consideration, the prices when expressed in Australian currency for wheat f.o.b. Australian ports at freight rates operating when the agreement was signed, were approximately a maximum of 11s. 2d. a bushel and a minimum of 7s. 2d. a bushel. Devaluation of the Australian pound has since raised these prices in terms of Australian currency to approximately 16s. 1d. a bushel and 12s. 1d. a bushel.

One of the main features of the agreement is that exporters are obliged to sell wheat up to their quota at the maximum prices prescribed and importers are obliged to buy wheat up to their respective quotas at minimum prices. Between the floor and ceiling prices wheat is free to move at prices agreed between buyer and seller. The contracting countries may engage in wheat trading outside the scope of the agreement provided they fulfil their obligations under the agreement.

So when we refer to the wheat market today we refer to something more than speculative buying and selling of this commodity, and include mutual planning between nations to safeguard the welfare of their producers and consumers.

In Queensland, we have had a system of organised marketing for wheat in operation for the past 29 years. This system is being continued and now occupies its modest place in the larger Commonwealth and International Schemes.



BRISBANE TOBACCO SALES.

At the conclusion of the October-November sales of South Queensland tobacco leaf, conducted in Brisbane for the Tobacco Leaf Marketing Board, the Minister for Agriculture and Stock (Hon. H. H. Collins) said that prices had been generally satisfactory.

Approximately 400,000 lb. was offered, half of this being leaf which had been passed in at the August sales through failure to attract the reserve price.

Some 350,000 lb. was cleared at the sale, at an average price of 52d. per lb.; the remaining 50,000 lb. of damaged leaf was being cleared satisfactorily by private treaty.

Mr. Collins said that it would be gratifying to Queensland producers to know that the leaf which was passed in at the August sale realised rather more than 10d. per lb. above the price offered in August.

ASTRONOMICAL DATA FOR QUEENSLAND.

JANUARY.

Supplied by W. J. Newell, Hon. Secretary of the Astronomical Society of Queensland.

TIMES OF SUNRISE AND SUNSET.

At Brisbane.			MINUTES LATER THAN BRISBANE AT OTHER PLACES.					
Day.	Rise.	Set.	Place.	Rise.	Set.	Place.	Rise.	Set.
	a.m.	p.m.						
1	4.56	6.46	Cairns ..	48	9	Longreach ..	43	27
6	5.00	6.47	Charleville ..	29	25	Quilpie ..	33	37
11	5.04	6.47	Cloncurry ..	63	36	Rockhampton ..	18	2
16	5.08	6.47	Cunnamulla ..	28	31	Roma ..	19	15
21	5.12	6.46	Dirranbandi ..	16	22	Townsville ..	40	9
26	5.16	6.45	Emerald ..	27	12	Winton ..	51	30
31	5.20	6.43	Hughenden ..	48	22	Warwick ..	2	6

TIMES OF MOONRISE AND MOONSET.

At Brisbane.			MINUTES LATER THAN BRISBANE (SOUTHERN DISTRICTS).							
Day.	Rise.	Set.	Charleville 27; Cunnamulla 29; Dirranbandi 19; Quilpie 35; Roma 17; Warwick 4.							
MINUTES LATER THAN BRISBANE (CENTRAL DISTRICTS).										
Day.	Emerald.		Longreach.		Rockhampton.		Winton.			
	Rise.	Set.	Rise.	Set.	Rise.	Set.	Rise.	Set.		
1	10	28	26	43	0	19	28	52		
6	12	29	27	44	2	19	30	52		
11	23	17	39	32	14	8	44	37		
16	30	9	46	23	21	0	46	3		
21	24	15	41	30	16	6	47	35		
26	14	25	29	41	4	17	33	49		
31	9	30	25	45	0	21	26	54		
MINUTES LATER THAN BRISBANE (NORTHERN DISTRICTS).										
Day.	Cairns.		Cloncurry.		Hughenden.		Townsville.			
	Rise.	Set.	Rise.	Set.	Rise.	Set.	Rise.	Set.		
1	6	50	35	63	20	49	6	42		
3	2	56	33	67	17	53	3	46		
5	6	55	35	67	20	52	6	45		
7	15	46	40	61	25	47	14	38		
9	26	35	47	55	32	40	22	30		
11	37	24	55	46	40	31	31	21		
13	43	11	59	38	44	23	36	11		
15	53	3	67	32	50	18	44	4		
17	56	2	68	32	52	17	46	3		
19	51	9	65	36	49	22	42	9		
21	42	19	58	43	43	28	35	17		
23	31	30	51	50	35	35	25	25		
25	20	39	44	57	29	42	18	34		
27	11	49	38	63	23	49	10	41		
29	3	55	34	67	18	52	4	45		
31	2	56	33	67	17	53	3	46		

Phases of the Moon.—Full Moon, 4th January, 5.48 p.m.; Last Quarter, 11th January, 8.31 p.m.; New Moon, 18th January, 5.59 p.m.; First Quarter, 26th January, 2.39 p.m.

On 15th January the Sun will rise and set 23 degrees south of true east and true west respectively, and on the 10th and 23rd the Moon will rise and set at true east and true west respectively. On the 3rd the Earth will be in perihelion, its nearest approach to the Sun.

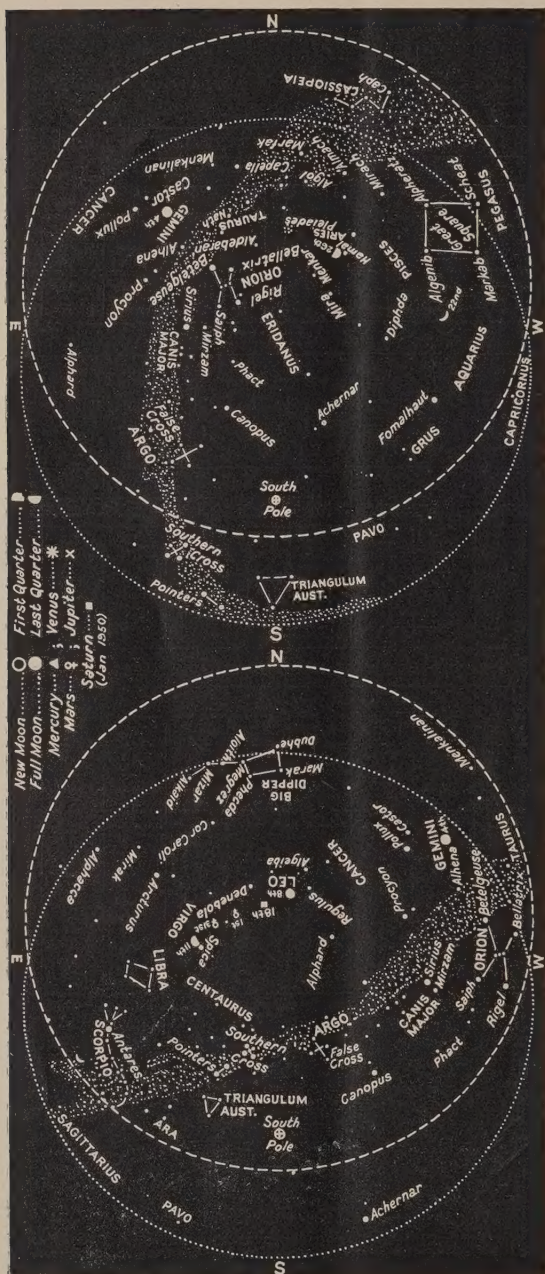
Mercury.—In the constellation of Capricornus, at the beginning of the month, will set 1 h. 15 m. after the Sun and will be in line with the Sun on the 18th, after which it will pass into the morning sky and by the end of the month, in the constellation of Sagittarius, will rise 1½ h. before sunrise.

Venus.—Now rapidly approaching the Sun; at the beginning of January setting 2¼ h. after the Sun, while at the end of the month it will be in conjunction with the Sun and set about Sunset.

Mars.—Rising before midnight in the constellation of Virgo. On the 1st it will rise just before midnight, but at the end of the month will rise between 9.45 p.m. and 11 p.m.

Jupiter.—Reaches conjunction with the Sun early next month, so is not favourably placed for observation. On the 1st it will set 1½ h. after the Sun and on the 25th will pass 7 degrees to the South of Venus. At the end of the month will set only 11 m. after Sunset.

Saturn.—At the beginning of the month will rise between 10.30 p.m. and 11.45 p.m., while at the end of the month will rise between 8.30 p.m. and 9.45 p.m.



Star Charts.—The chart on the right is for 8.15 p.m. in the south-east corner of Queensland to 9.15 p.m. along the Northern Territory Border on the 15th January. (For every degree of longitude we go west the time increases by 4 minutes.) The chart on the left is for 7 hours later. On each chart the dashed circle represents the horizon as viewed from Cape York and the dotted circle is the horizon for places along the New South Wales Border. When facing north hold "N" at the bottom; when facing south hold "S" at the bottom, and similarly for the other directions. Only the brightest stars are included and the more conspicuous constellations named. The stars, which do not change their relation to one another, moving east to west, arrive at any selected position about 4 minutes earlier each night. Thus, at the beginning of the month, the stars will be in the positions shown about 1 hour later than the time stated for the 15th, and at the end of the month about 1 hour earlier than that time. The positions of the moon and planets, which are continually changing in relation to the stars, are shown for certain marked days. When no date is marked the position is for the middle of the month.

